THE C.S.E.T. MANUAL FOR TUXIS BOYS

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Canadian

THE C. S. E. T.

MANUAL *for* TUXIS BOYS

(BOYS 15 YEARS AND OVER)

INCLUDING

THE CANADIAN STANDARD EFFICIENCY TRAINING PROGRAM

Over Two Hundred Illustrations
By Leonard Rossell

With the Approval and Endorsation of

The Canadian National Advisory Committee for Co-operation in Boys' Work

Published by

THE COMMITTEE ON CANADIAN STANDARD EFFICIENCY TRAINING OF THE NATIONAL COUNCIL OF YOUNG MEN'S CHRISTIAN ASSOCIATIONS OF CANADA

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1918
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THE CANADIAN STANDARD EFFICIENCY TRAINING

for

TRAIL RANGERS & TUXIS BOYS

A Program of Religious Education to Promote the Four-fold Development of Canadian Boys

Prepared by

The Committee on Canadian Standard Efficiency Training of the National Council of Young Men's Christian Associations of Canada

in co-operation with the

CANADIAN NATIONAL ADVISORY COMMITTEE FOR CO-OPERATION IN BOYS' WORK

composed of official representatives from

The Sunday School Boards of the Baptist Conventions in Canada.

The Young People's Department of the Congregational Union of Canada.

The General Board of Religious Education of the Church of England in Canada. (Formerly the Sunday School Commission.)

The Canada Conference of the Evangelical Association.

The General Board of Sunday Schools and Young People's Societies of the Methodist Church.

The Board of Sabbath Schools and Young People's Societies of the Presbyterian Church in Canada.

The Canadian Council of Provincial Sunday School Associations.

The National Council of the Young Men's Christian Associations of Canada.

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By the Committee on Canadian Standard Efficiency Training

PREFACE

THOSE interested in work with Canadian boys have observed with enthusiasm the remarkable expansion of the program for adolescent boys now known as the Canadian Standard Efficiency Training.

It originated in 1912, when the Canadian Standard Efficiency Tests were prepared by Taylor Statten under the direction of the Boys' Work Committee of the National Council of Young Men's Christian Associations of Canada. It was intended at the outset as a *course of training* for older boy members of the Associations in Canada, but it received such widespread approval, not only from Association workers but from the leaders of many other organizations, that, following their requests, it was enlarged to meet their needs and adapted to their work.

Recognizing to some extent the possibilities of enlarging the scope of the Program, the National Council authorized the appointment of the C.S.E.T. Committee, comprising prominent young business men, which for some time carried on experiments and gathered considerable information.

In 1914, the suggestion came that, if the plan were made progressive and more comprehensive, it might become the accepted program of work for teen-age boys in the Canadian Sunday Schools. The various National Sunday School Boards were, therefore, invited to appoint representatives on the Committee for this purpose and the following bodies responded:

The Sunday School Commission of the Church of England in Canada.

The General Board of Sunday Schools and Young People's Societies of the Methodist Church.

The Board of Sabbath Schools and Young People's Societies of the Presbyterian Church in Canada.

The Sunday School Board of the Baptist Convention of Ontario and Quebec.

The Canadian Council of Provincial Sunday School Associations.

This marked another epoch in the development of the Program. A committee composed of the representatives of the above named bodies, to which has since been added other units, became known as the Canadian National Advisory Committee for Co-operation in Boys' Work. These committees developed the Program until now it is the recognized program for boys in the Churches, Sunday School Associations and Federations and the Young Men's Christian Associations.

The last four years have seen continued development and have found the Program meeting with real success under all conditions. There are many boys in Canada to-day who carry the stamp of its influence upon their character and a host of others who have benefitted by this course of training under the leadership of consecrated men.

The original handbook, which was in its eighth edition, became inadequate for the increased expansion and influence of the Canadian Standard Efficiency Training. In order, therefore, that the work throughout Canada might be uniform and intelligent, this Manual has been prepared, the purpose of which is to furnish older boys and their leaders with practical methods of work, as well as inspiration. The Program has been amplified by the Committee on Canadian Standard Efficiency Training and the National Advisory Committee for Co-operation in Boys' Work with the assistance of a General Committee of over two hundred Boys'

Workers throughout Canada who have gathered up the experience of the last five years in the work.

Three divisions have been made in the Program to correspond with the periods of development in adolescent boyhood. The Trail Rangers' Program, including boys from 12 to 14 years, is developed to meet the peculiar needs and characteristics of early adolescence. The TUXIS BOYS' Program, including boys from 15 to 17 years, is further amplified and altered to conform with the growth a boy experiences in passing through middle adolescence. The latter adolescent period takes in the term of young manhood during the years from 18 and up, when peculiar problems again present themselves in his advancement. In view of the radical progress occurring between early and middle adolescence, it has been deemed wise to separate completely the methods of work between the Trail Ranger and TUXIS BOY periods. This Manual is issued, therefore, especially for boys 15 to 17 years of age, who are known as TUXIS BOYS.

The task of preparing this Manual has rallied the services of those eminently fitted for such work, for each is an expert in his own department, and the Editorial Committee feels it is to be congratulated in having such men give their time and the benefits of their ripe experience to this movement among boys. It would be impossible adequately to thank all, or even mention their names, who by advice and kindly criticism have assisted in the preparation of the book, but to the authors whose names are attached to the various chapters, and to those who have been generous in the use of copyrighted material, we acknowledge a deep obligation. Without the help which they have so kindly provided this book could not be.

We wish to express our appreciation to Taylor Statten, National Boys' Work Secretary of the National Council of Young Men's Christian Associa-

tions of Canada, whose life has been given to the movement since its inception and whose best energies are prodigally expended on its furtherance, for the value of the contribution he has constantly made.

We wish to express an appreciation also of the most worthy contributions made by the following: H. H. Horne, Ph.D., Professor of the History of Education and the History of Philosophy, New York University; Rev. C. A. Myers, M.A., Associate General Secretary of the Board of Sabbath Schools and Young People's Societies of the Presbyterian Church in Canada; Rev. Frank H. Langford, B.A., Education Secretary of the Board of Sunday Schools and Young People's Societies of the Methodist Church; Rev. R. A. Hiltz, M.A., General Secretary of the Sunday School Commission of the Church of England in Canada; Norman E. Richardson, S.T.B., Ph.D., Director of the Department of Religious Education, Boston University.

Special mention should be made of the work of Capt. A. Wallace Forgie, Secretary of the C.S.E.T. Committee, who has been indefatigable in the correlation of the mass of information and material considered by the Committee. On his going to France in September last the work was continued by Mr. Gordon K. Hignell, a well-known boys' worker of the Central West.

We announce with the deepest regret that just as the press work of this book was completed, Mr. Hignell contracted pneumonia and passed away in Winnipeg, on October 21, 1918, just one week after he had returned from Toronto and his labors in connection with this book. Mr. Hignell had served overseas and on his return again took up Boys' Work. He loved Canada and Canadian boys, and those who use this book are deeply indebted to him for his unselfish and tireless efforts on their behalf during the last weeks of his life.

October, 1918. THE EDITORIAL COMMITTEE.

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CHAPTER I

INFORMATION FOR TUXIS BOYS

What is a Tuxis Boy?

FOR several years through the program of the Canadian Standard Efficiency Training, many thousands of the keenest of Canadian older boys have been developing into citizens who will some day become the leading business men, agriculturalists, professional men, manufacturers and statesmen throughout our land.

This movement has met with such a ready response that those who are promoting it feel justified in doing everything possible to make it a larger and more permanent factor in the development of older Canadian boys. Some day it will be quite easy to describe a TUXIS BOY. To-day we can picture him only in the light of what the Canadian Standard Efficiency Training has produced during the past five years.

When a trainer takes charge of an athlete with the intention of producing a high jumper, he has in his mind a picture of the form he wants his man to show as he goes over the bar. It is so with the men

who have been working out this course of training for older Canadian boys. They have clearly in mind the type of young manhood that such training should produce.

The TUXIS BOY will be strong physically. In all probability he will be an athlete because he will have followed a scientific course of training in physical development which has been set up by the leading athletes and physical directors of Canada. During the three years he will have competed in many of the Athletic Meets promoted in his community by the "TUXIS BOYS' Council."

The boy who admires the way a professional baseball player handles himself when on the diamond, may some day become the admiration of a host of younger boys because, during his training in four-fold development, he will have engaged in many exciting baseball games. The same may be said of hockey, football, basket-ball and the other team and group games in which every follower of this course of training will have taken part.

The TUXIS BOY will be strong intellectually. When given the opportunity, he will be able to face an audience and express his thoughts convincingly because on many occasions he will have done the same thing before the little group of fellows who are members of his Tuxis Square. He will have made trips to places of historical and industrial interest with the other members of his Square, and, in the latter, will have had an opportunity to learn of the many ways in which men make a living. This will help him in the choice of a life work.

Another feature of the TUXIS BOYS' Program is Camping and Woodcraft. What a joy it is to the director of a boys' camp to see a boy who has never paddled a canoe nor slept in the open develop into a resourceful, self-reliant, out-of-doors boy who can make himself just as comfortable in the backwoods

as he would be at home on a spring mattress. TUXIS BOYS will be experienced campers. TUXIS BOYS who have access to the water will not merely know how to swim but they will be expert swimmers and divers knowing the crawl stroke and the many forms of fancy diving.

TUXIS BOYS will also be strong socially. They will make their leisure time profitable. They will always have something worth while to do. There will be plenty of fun and good times. Above all, they will not be lopsided boys. At a glance, even a stranger will see that they stand four-square. Their training will not interfere with their school work but will make their studies more enjoyable and their school life more pleasant.

The TUXIS BOY will find many new interests which will centre around his home and make it more attractive and, as he follows from week to week the suggestions outlined by his Mentor, he will unconsciously acquire a strength of personality which will enable him to achieve that which he little dreamed lay within his power.

The TUXIS BOY will be developed religiously. His Church and Sunday School will take on a new meaning. In fact, the inspiration for his entire life will centre around his Tuxis Square, which will meet not only as his Sunday School Class during the Sunday School hour, but also on one evening during the week.

It is said that the Tuxis Program is a training in Canadian Citizenship. It is that and more. It is a training in Canadian *Christian* Citizenship. The entire program is Christ-centered. It is based on the Bibical record of the growth and development of Jesus Christ of whom, when he was the age of TUXIS BOYS, Luke, the physician, tells us "increased in wisdom and stature and in favor with God and man."

The word "TUXIS" is made up of five letters, each having a very significant meaning. "T" stands for Training, the last letter "S" for Service—"Training for Service." "X" placed in the centre denotes the Greek letter "Chi," the first letter in the Greek word "Christos" or Christ, which is to indicate that the Program is Christ-centered. The "U" and "I" suggest our social relationships, the attitude of brotherliness and unselfishness—the "Help the Other Fellow Spirit." You will notice that "YOU" comes before "I."

How to Become a Tuxis Boy

One may easily become a TUXIS BOY either by joining a Square already organized or by forming a new Square. If you are a member of a Sunday School Class of boys fifteen years of age and over, have it properly organized and get your Sunday School Teacher to register as a Mentor. Upon registration, he will receive the attractive Initiation Ceremony and full instructions as to the method of procedure. You can at once commence the course of training which you will find outlined on pages 23 to 87. As the training proceeds, you will win the Honor Badges, the requirements for which will be found in Chapter XVIII.

The first step is to become charted. It is explained more clearly in the article "Charting" on page 12. A Charting Form for TUXIS BOYS is found on page 14.

When you are charted, you will be eligible for a seat in the Community Conclave and to a vote for Tuxis Councillor or for member of the Provincial and National Boys' Parliaments. You will also be eligible for election to the TUXIS BOYS' Council.

Some Features of the Tuxis Boys' Program

The TUXIS BOYS' PROGRAM is a recognized course of training of the Churches in Canada for boys fifteen years of age and over. A TUXIS Square is usually a Sunday School Class of boys. Their teacher is known as a Mentor. The boy who is elected to preside is known as a Pretor. The boy who assists the Pretor, and who in the absence of the Pretor presides, is known as the Deputy Pretor and is usually called the "Dep." The boy who is elected to keep the minutes and attend to the correspondence for the Square is known as the Scriptor, and the boy who is responsible for the money is called the Comptor. Usually the group or class is known as a Square. The boys choose a name for their Square, a motto, an emblem and colors

The Initiation Ceremony is an attractive feature of the TUXIS BOYS' Program. Full instructions for the initiation are given in the Initiation Ceremony Booklet which is also a souvenir of a TUXIS BOYS' entrance into the Square. Copies of this can be secured only through a registered Mentor. He should fill in the registration blank at the back of this Manual. If he encloses $1.00, he will receive the material necessary in the organization of a Tuxis Square and other literature of interest to Mentors.

A Square should consist of not more than ten members and not less than six. Eight is the ideal number. Each Square will have two meetings each week, one the regular Sunday School Session and the other on one evening during the middle of the week. From September until May, the Mid-week Sessions will usually be held indoors, but the Program provides plenty of opportunity for outings, hikes, treasure hunts, camping parties, athletic meets, skating and other outdoor activities.

The Sunday School Session

Every Pretor should follow an outline in the conduct of both the Sunday and Mid-week Sessions. While it is understood that each church has the right to prescribe the opening and the nature of the Sunday Session, this Session should at least include the following points:

(a) Square opened by Pretor in the chair, calling the meeting to order.

(b) Short prayer by the Pretor or some member of the Square, or scripture sentence prayers by several members, or the Lord's Prayer repeated together.

(c) The Scriptor reads the minutes of the last meeting. These minutes will refer to the Mid-week Session and activities of the Square, thus connecting up these activities with the Sunday Session.

(d) Brief minute reports by the Comptor and Committee Conveners.

(e) The Pretor calls upon the Mentor to lead the lesson period. This should be an informal discussion, every member of the class taking part under the direction of the Mentor.

(f) Announcement of the place and character of the Mid-week Session of the Square.

While it is desirable that every Square should have a separate room or space curtained off in which to hold their Sunday meeting, it is not essential for the carrying out of the above session program.

The Mid-week Session

The Mid-week Session of the Square should at least include the following points:

(a) Meeting opened by the Pretor in the chair.

(b) Opening ceremony. This will be provided when the Mentor registers.

(c) Reading of the minutes of the last meeting by the Scriptor. This will be the minutes of the Sunday Session including a review of the outstanding points in the lesson, thus making them apply to the work of the week.

(d) Initiation of new members. A copy of this ceremony will be sent to the Mentor when he registers.

(e) Business items. These must be carefully planned in advance by the Pretor and Mentor in consultation with the other officers and committee conveners so as not to occupy too much time at the meeting.

(f) Bible discussion led by the Mentor for 20 minutes. Suggestions for these courses of study will be found on page 67.

(g) Practical talk of about twenty minutes. This is usually given by some outsider who has been invited to address the meeting on one of the subjects named in the Program.

(h) Tests, group games, etc., for thirty minutes.

The Local Advisory Committee for Co-operation in Boys' Work

The units mentioned on the title page are co-operating nationally and provincially in the promotion of the TUXIS BOYS' Program. In a large number of places, Local Committees consisting of representatives from these units are organized on the same co-operative basis as the Provincial and National Committees. The representatives are elected or appointed by their churches each year. This group is known as the Local Advisory Committee for Co-operation in Boys' Work.

The Secretary of this committee should keep closely in touch with the Secretary of the Provincial

Advisory Committee for Co-operation in Boys' Work.

The Tuxis Boys' Council

This Council is brought into existence by the Local Advisory Committee for Co-operation in Boys' Work. Every TUXIS BOY who is a member in good standing of a registered Tuxis Square, and who has been charted by his Mentor, is entitled to a vote and is eligible for election to the Local Council. Every Square is entitled to at least one representative in the TUXIS BOYS' Council. Usually two Councillors are elected from each Square. This Council should be organized to correspond with the Local Municipal Council. It has for its purpose the bringing together of the TUXIS BOYS of a district, town or city, for some object of common interest and for united action on the part of all Trail Ranger Camps and Tuxis Squares. There should be at least one stated annual meeting. Other meetings should be arranged by the Executive as the work may demand.

The TUXIS BOYS' Council will be represented on the Local Advisory Committee for Co-operation in Boys' Work by as many members as the Local Advisory Committee deem advisable.

Community Conclave

Where a number of Squares of TUXIS BOYS meet for an occasional joint "get-together," a meeting which might be described as a "tournament" or "round-up," or in Indian language, a "pow-wow," may be held. It may be arranged for the purpose of hearing an outstanding speaker give a talk on some special subject, but usually the chief features will be contests and challenges. For instance, each Square will enter their best speaker in an oratorical contest or their best rooster-fighter, squaw-wrestler and tub-tilter in the various group games. Com-

petition may also be held in first aid and life-saving demonstrations. The ability-to-entertain contest will always be a favorite. Contests in songs, yells and rythmic pantomime will furnish most attractive numbers for the program.

These Community Conclaves should be organized and promoted by the Local Advisory Committee for Co-operation in Boys' Work, assisted by the TUXIS Council.

Tuxis Boys' Provincial Parliament

Any member of a Tuxis Square who has been a member of a TUXIS BOYS' Council is eligible as a candidate for the TUXIS BOYS' Provincial Parliament. The First Provincial Parliament was held in Ontario, December 27th-30th, 1917. The responsibility for the promotion and conduct of a Provincial Parliament rests with the Provincial Advisory Committee for Co-operation in Boys' Work.

Tuxis Boys' National Parliament

Any member in good standing of a Tuxis Square who has served as a member of a TUXIS BOYS' Provincial Parliament is eligible as a candidate for the TUXIS BOYS' National Parliament. The responsibility for the promotion and conduct of the National Parliament rests with the National Advisory Committee for Co-operation in Boys' Work, assisted by the Provincial Advisory Committees.

All the Councils and Parliaments will be conducted as nearly as possible according to parliamentary procedure, thus training the members for Canadian citizenship. The question dealt with by the Parliaments will have to do with the development and promotion of the Canadian Standard Efficiency Training and other subjects related to Canadian boy life.

Graded Citizenship Franchise for Tuxis Boys

QUALIFICATIONS REQUIRED	FRANCHISE PRIVILEGES
Citizen	
(a) Membership in C.S.E.T. Group (Trail Rangers or TUXIS BOYS) with registered Mentor. (b) Have Charting Interview.	(a) Vote for election of representatives to Township, Town, City, or City District Council. (b) Be member of Grand Camp or Community Conclave.
Councillor	
(a) Membership in TUXIS Square. (b) Have attended a Boys' Work Conference.	(a) Vote and represent as above. (b) Eligible as representatives to Township, Town, City or City District Council.
Member Provincial Boys' Parliament	
(a) Member of C.S.E.T. group 18 to 20 years of age. (b) Have served as Councillor.	(a) Vote and represent as above. (b) Eligible as candidate for Provincial Parliament.
Member National Boys' Parliament	
(a) Member C.S.E.T. group 18 to 20 years of age. (b) Have been member of Provincial Parliament.	(a) Vote and represent as above. (b) Eligible as candidate for Dominion Parliament.

Membership Badge

The Badge of the TUXIS BOY is a square with a cross in the centre, the idea symbolized being the four-square life which is Christ-centered. The colors on the Badge are red, white and blue. An attractive membership pin incorporating the Badge design may be worn by TUXIS BOYS. These can be secured through registered Mentors.

Tuxis Boys' Membership Badge

Honor Badges

Every TUXIS BOY is entitled to wear a sweater badge with the design of the membership badge in the centre. There are spaces on this badge for Honor Badges. These are made of silk and will be attached to the felt sweater badge as they are won. Honor Badges are of three degrees: Red Honor Badges, the first class; Blue Honor Badges, the second and White Honor Badges, the third class.

Charting Honors

Charting Honors differ from Honor Badges in that the degree of attainment is marked on the Chart as a sign of a TUXIS BOY'S progress. Charting Honors do not include Honor Badges except where stated, and where Charting Honors alone are printed in the Program no Honor Badge is given. Charting Honors are of three degrees as shown on the Chart Form on page 14: White Honors the lowest honor line, or third class; Blue Honors the middle honor line, or second class; and Red Honors the top honor line, or first class.

"The Second Mile"

In order to win any of the Honor Badges, a boy must qualify not only for that particular Badge, but he must also have fulfilled the requirements for what is known to TUXIS BOYS as the "Second Mile." This will be explained in the Initiation Ceremony.

Supplementary Features

The Initiation Ceremony and the Plan of Tuxis Citizenship as well as Honor Badges are all supplementary to the Program for Tuxis Boys. They are valuable as an aid in creating interest and will help the Tuxis Square to obtain more from the use of the Program. They are not essential, however, and if local conditions do not permit of them being used, any or all may be omitted without interfering with the promotion of the Program itself.

Charting

A SAFETY razor advertisement read like this: "One reason why a man should use a safety razor rather than patronize a barber is that it forces him to occasionally take a good square look at himself." None of us will doubt the wisdom of the ancient advice "Know thyself," and we will all join with Bobbie Burns in singing:

"Oh wad some power the giftie gie us,
To see oursel's as others see us!
It would frae monie a blunder free us
And foolish notion."

Charting is the term used to indicate the personal interview between the Mentor and a TUXIS BOY where they talk together over the Program and try to find out to what extent the boy is getting the training for which the Program calls. There is no attempt made at measuring the boy's personality or powers or virtues, for this is beyond the realm of possibility, but they do try to work out together the extent of training that the boy has had during the previous twelve months. Only those things which have a natural and necessary place in the training of older boys have been included in the Program for TUXIS BOYS and the Charting is an endeavor to picture or indicate in a graphic way the extent to which they actually enter into the boy's training.

Every boy enjoys having a talk with some man he admires, especially if they talk about the things in which he is interested. Some men seem to know exactly what to talk about, but no man and boy ever had a conversation that centered around more interesting topics than those which are discussed during a Charting Interview. Many a boy dates the beginning of a new era in his life from the Initial Charting. He has come into life-giving contact with a personality stronger than his own. Through

the character and counsel of a true friend, he gets a new grip on life and goes away with a determination to master himself and to carve out a useful future.

Charting is one of the first things that a TUXIS BOY should arrange for. He can learn more in a couple of hours about the exact course of training he needs than would otherwise be possible in several months. He goes away with a record of it, a copy of his Chart, to which he may frequently refer.

Boys who have a tendency to turn their thoughts inward and think about themselves too much, to ponder upon their virtues and their vices, will find that the Charting Interview will direct them toward purposeful activities which will fully occupy their leisure time. Many a boy has been saved from this morbid introspection by losing himself in some wholesome interest.

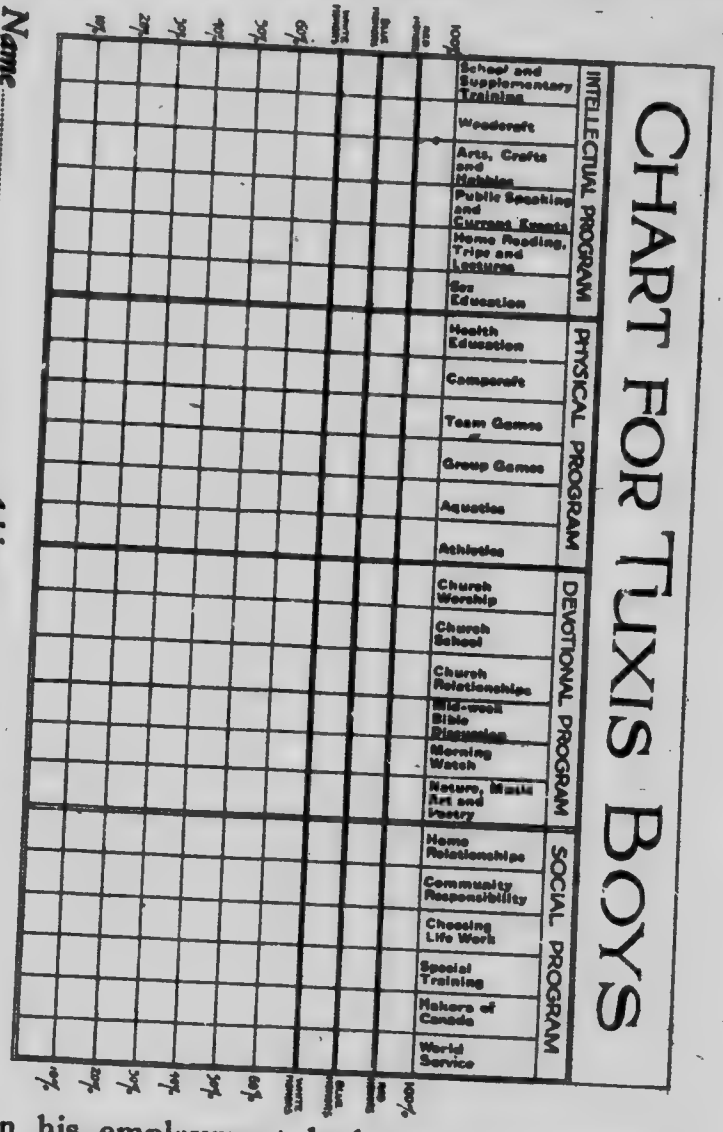
A boy cannot be initiated into a Tuxis Square and does not have the right to vote or hold office in the Tuxis Council until he has had this Initial Charting.

The Second or Annual Charting takes place at the end of the season. This time, the Mentor reviews with the boy the record of the work during the year and together they lay plans for the coming season.

The Charting Form of the boy who has had his Initial Charting will look something like the one on page 16. You can easily picture the talk with Mr. Fraser, the Mentor, that has resulted in such a chart.

Jim is an employed boy who is ambitious and is carrying a heavy night school course in an endeavor to get his matriculation. As a result, he has reached Blue Honors under "School and Supplementary Training," but never having taken the C.S.E.T. Program for TUXIS BOYS, he was not so familiar with Woodcraft, had done very little Public Speaking and found it difficult, nor had he received Sex

Instruction from his father or Mentor, though trying to live the spirit of that knowledge.



Jim in his employment had used opportunities for observing many processes of manufacturing. His hobby was mechanics and so he obtained

White Honors under "Arts, Crafts and Hobbies" for the things he had made.

Jim was an athlete. He had a fair knowledge of how to take care of his body, had attended Boys' Camp each summer, was a cracker-jack at hockey, baseball, basket ball, and had played foot-ball and lacrosse in local leagues. He had a fine knowledge of group games and could explain how they were played.

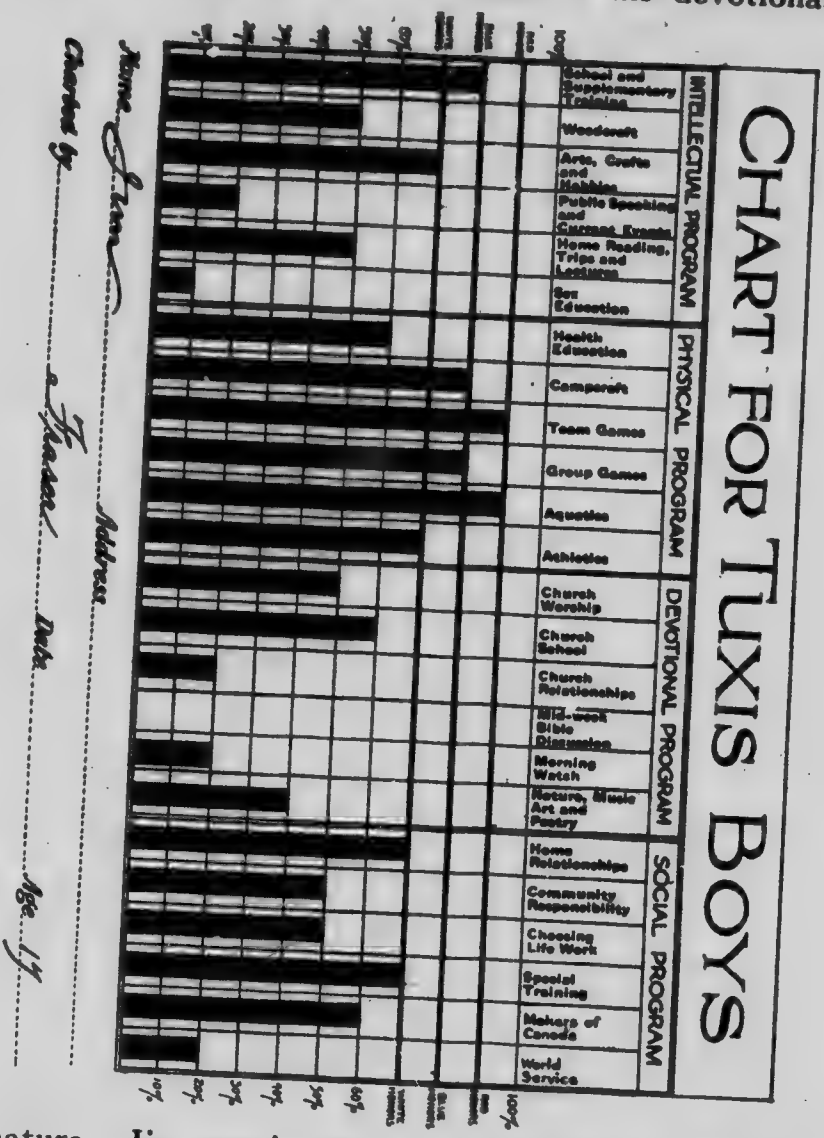
Jim's honors under the Physical Program were many. His ability to swim and his knowledge of Life Saving gave him Blue Honors, and his all-round standing in athletics, though he had never thrown at a target, was so good that he obtained White Honors.

Jim attended church occasionally; he thought about half the time, and his Sunday School attendance was only a little better. His class was just commencing the TUXIS BOYS' Program and formerly had met only a few times in the year during the mid-week. He had never made a habit of the Morning Watch. He knew very few of the masterpieces of music or art, though he had a fair knowledge of church relationships.

Socially Jim came up a bit. His hobby kept him at home a lot and there he was the idol of younger brothers and sisters, as well as his father's right-hand man. He had helped in various community patriotic enterprises during the past year, and was, because of his ambition, thinking of his life work. He had taken First Aid which helped him up on "Special Training." He was a reader of Canadian history and could tell some of the "Makers of Canada." His standing was not so high on "World Service" because of a lack of understanding and support of missionary enterprises.

You can see at a glance from the Chart that Jim was "long" on the Physical and only fair on the

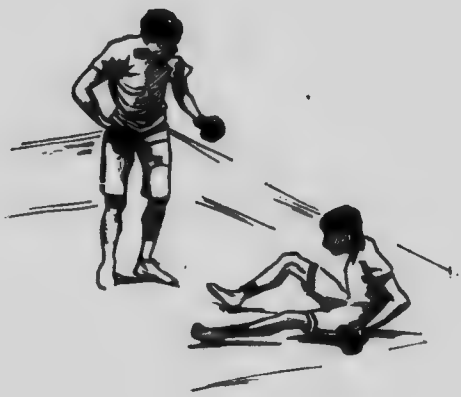
Intellectual and Social side of his life, and was below the average in the development of his devotional



nature. Jim saw it, too, when his Mentor and he finished the Initial Charting and he went away that evening resolved that in the following of the TUXIS

Program he would stress less on the Physical side and study along the lines that would round out his Intellectual training. He had mentioned the matter of Church Membership to Mr. Fraser and subsequent events have shown that he had done some very clear thinking on the subject, for he took a Church Relationship course and joined his Church, throwing the force of his energy into its work. Though his spirit of service was good, he made up his mind that he would be more social by making that service wider in its scope.

That is something of the method of marking the Chart in the initial interview, though yours might have quite a different appearance from Jim's chart. One can readily see also that because of the resolutions Jim had made in his own mind, his next Annual Chart would mark up quite differently from the one here shown.



THE FOUR-FOLD PROGRAM

THE FOUR-FOLD PROGRAM

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CANADIAN STANDARD EFFICIENCY TRAINING

A Four-fold Program of Religious Education for

TUXIS BOYS

(15 Years and Over)

"Jesus increased in wisdom and stature and in favor with God and man."

"I am among you as he that serveth."

INTELLECTUAL PROGRAM

1. *School and Supplementary Training.*
2. Woodcraft
3. Arts, Crafts and Hobbies
4. Public Speaking and Current Events
5. Home Reading, Trips and Lectures
6. Sex Education

PHYSICAL PROGRAM

1. *Health Education*
2. Campcraft
3. Team Game
4. Group Games
5. Aquatics
6. Athletics

DEVOTIONAL PROGRAM

1. *Church Worship*
2. Church School
3. Church Relationships
4. Mid-week Bible Discussion
5. Morning Watch
6. Nature, Music, Art and Poetry

SOCIAL PROGRAM

1. *Home Relationships*
2. Community Responsibility
3. Choosing Life Work
4. Special Training
5. Makers of Canada
6. World Service

CHAPTER II

INTELLECTUAL PROGRAM

"Jesus increased in wisdom...." Luke 2:52
Thou shall love the Lord thy God....with all thy mind...." Luke 10:27

THE mind is capable of wonderful development and youth is the time when a large measure of this development must be accomplished. Through a well-developed mind we come to know ourselves better, to appreciate our fellow-men more fully, to perceive more of God's truth and to understand something of the meaning and purpose of life.

Someone has said that "woodcraft is the first of the sciences in point of time and should therefore come first in education." Certain it is that there is a great store of knowledge to be learned through woodcraft pursuits. Every TUXIS BOY is encouraged to become a lover of the out-of-doors, to learn the interesting and valuable lessons which may only be learned through a first-hand contact with Nature.

Our Schools and Colleges undoubtedly furnish the best and most complete training. It pays to stay at school, even at a real sacrifice, until one has

secured the best possible training for the life work one expects to follow. Those who cannot possibly stay on in School, should take advantage of night courses offered by High Schools and Technical Institutes, short courses conducted by Agricultural Colleges, or Business College and Correspondence Courses. The all-important thing is to lay a good foundation upon which a noble career may be built.

No fair student of the New Testament can fail to note the intellectuality of Jesus. He was broad-minded in every sense of the term. The range of his knowledge was great. The quality of it very rare. There was a certain remarkable universality about His grasp of truth and a penetrating keenness about His understanding that made it possible for him to see clearly in the most perplexing situation and judge rightly in face of the crucial test-questions set for Him by the shrewdest scribes and lawyers of his day. His replies in debate were like rapier thrusts. He so disarmed his antagonists that finally they "durst ask him no more questions," seeking to entrap Him.

It is only as we use to the full our opportunities for formal education and interest ourselves in such supplementary features as Woodcraft, Public Speaking, Home Reading, Sex Education, Arts, Crafts and Hobbies, that we may claim to be following fully the Great Master who, although not trained in the higher rabbinical schools, was more than a match for the keenest and best-trained minds of his day.

I

School and Supplementary Training

DO you ever feel, TUXIS BOY, like quitting your studies before you have finished your High School course? Does it ever seem to you that Latin, grammar, algebra, etc., are no good in helping you

get along in the world? Or, perhaps, you feel that some particular teacher is making life a burden for you. On the other hand, you see some of the fellows getting on famously in business, with money to spend, no studies to worry over, more freedom from restraint and, altogether, having a much better time.

Every TEXAS BOY, however, is thinking of the great day when he will be a success. He thinks of the man who bears his name standing there four-square in the future, the master of a big job, the man of large responsibility, the leader whom people look to when great work is to be accomplished—the really successful man. It's a splendid vision you see, but how do you get there?

The boy who goes directly into business at the age of fourteen or fifteen is handicapped for life, there is no doubt about that. He has to rely very largely upon the schooling he then possesses to take him through his career. Do you know, lad, that it is only in the last year or two of High School that your mind begins to judge the relative nature of things and to balance the true with the false? Each of these years is worth more than double any previous year in the way of true mental development. The hours you spend in hammering away at some subject that seems so hard to get will be worth pure gold to you when you come to grapple with the monotonous problems sure to arise later in any business position worth occupying. Many a fellow of thirty is plugging away in a blind-alley job, poorly paid, with little responsibility and, therefore, little opportunity, who says: "If I had only stayed at school and taken my matriculation, things would be different. I could have gone through for law and not be stuck here forever. I could at least have taken that position up ahead, but they gave it to my desk-mate because he had a better education and could handle it." Many a man looks to-day to a bigger

opportunity ahead and says: "If I had a college-trained mind, I could fill that place."

But, you may say: "That doesn't help me, I left school too early but I can't afford to go back now." Quite true, but you needn't forego your education. What do you do with your evenings? Do the movies claim your time? At any rate, why not tackle a Night School Course? Get your matriculation or take studies that will train you along the lines of your business—a good Correspondence Course perhaps. Every Canadian boy under twenty years of age should be either attending Day or Night School or spending at least two evenings a week from October to May on some course of study at home.

As surely as training on the track builds up leg muscles; actually adding new tissue and making bigger muscle to bring you in at the head in the mile race, so study builds up more brain cells, making a more effective brain to use in bringing you in ahead in the race of life.

Formal education not only develops your brain and gives you a better one to think with, but it directs the better thoughts your fine, strong brain thinks out. If you don't stay on the track in the mile race, but wander to one side and then the other, you don't finish very soon. Education trains your mind to think "in a straight line," to keep your mind on the track, so that you finish strong.

Canada needs leaders, men who can tackle its problems and solve them. The man with a good intellect—a strong, developed brain and well-trained mind—will be well on the way to leadership. If you stick at studies not only will you bring yourself nearer to that place of leadership, but you will have the wonderful world of books, the beautiful world of art, the useful world of science, opened up to you for your pleasure and for your profit.

School and Supplementary Training—Test

1. School.

(a) Full time attendance at School, Technical Institute or Business College. *The term full attendance means attendance at school every day, except in case of sickness or other reasonable cause.*

(b) Taking Matriculation Course at Night School or through private study. Covering the full year's work of a High School in a year.

CHARTING HONORS

1st. Red.....Full time attendance, 85% in studies.
2nd. Blue.....Full time attendance, 75% in studies.
3rd. White .....Full time attendance, 60% in studies.

2. Supplementary Training.

(a) Full time attendance at the following:
Night School, General and Business Training.
Well-planned Private Studies and Test.
Apprentice and Part-time School.
Correspondence Courses.
Education gained through Employment.
District Short Courses in Agriculture.
Agricultural College Short Courses.
Reading Courses (using Agricultural Bulletins) and Test.

For Night School work, the Honors awarded will depend upon the standing given by the Local Board of Judges.

CHARTING HONORS

1st. Red.....Carry out fully any four of the above.
2nd. Blue.....Carry out fully any three of the above.
3rd. White.....Carry out fully any two of the above.

Honors awarded under 2 must have the approval of the Local Board of Judges.

Attendance at one Practical Talk will be required each year. It may be given on any of the following topics:
"The Meaning and Value of Education."
"Why Attend College."

"Points to be Considered in Selecting the C " ge you will attend."
"How to Study."
"Value and Sources, etc., of Correspondence Courses."
"How to Get the Most Out of a Correspondence Course."
"The Need for and Value of a Definite Purpose in Planning your Education."

"Relation of Education to the Greater Enjoyment of Life."
"How Education Enables us to Live Happily and Helpfully with our Fellows."
"Acquaintanceship with Great Personalities through Education."
"Education as the Process of Learning the Sources of Knowledge."

For rural boys, tests along the following lines might be used with reading courses, etc.:

Keeping Satisfactory Milk Records.
Acre Profit Competitions.
Dairy Profit Competitions.
Beef and Hog Profit Competitions.
Keeping records of Growth of Grain.
Experiments in Spraying.
Experiments in Weed Eradication.

II

Woodcraft

"FIND tongues in trees, books in the running brooks, sermons in stones, and good in everything."

Most of us know the dreariness of wandering in a strange city through crowds of people whom we know not and who know not us. When you are in the woods and even in the "Silent Places," all about you are created things in myriad forms, thousands of trees, flowers, birds, fishes, stars,

animals, insects, all with un-ending points of interest to study, to learn and to remember.

If you know nothing of any of these things, their names, their forms, their lives, their uses, a walk is but a mechanical exercise and you turn homeward no better equipped for enjoying God's great out-of-doors than when you started out. But if on every walk you are alert to watch the swaying boughs, the winding paths, the starry firmament, the rocky shore, or whatever your path reveals to you, friends new and old will greet you at every turn and, though none of them have speech, many of them have not even eyes, ears or feeling, yet you can regard them as acquaintances and even as friends.

Would you enlarge the circle of your acquaintances? A boy who never makes friends with the birds, flowers and other created things, is undeveloped, is missing some of the youthfulness of life. He is missing something that for others gives life a joyous fullness if he averts his eyes and his understanding from the wonderful procession of interesting things that present themselves at every turn of life.

New friends as well as old friends, new scenes as well as old scenes "will lovelier be, as more of Heaven in each we see." There will be no bored look in our eyes as we journey along the road, if on the roadsides we see, not mere ditches and fences made by man, but a feast of color set in array before us by a beneficent Creator. Goldenrod, asters, cornflowers, milkweeds, spreading-dog-bane, St. John's wort, evening primroses and myriads of other flowers, many of them with a delightful fragrance, crowd upon the vision. Join us in our excursions in woods and fields! Gaze with an interested eye into "those illimitable spaces where God has set His jewels in array."

Woodcraft—Test

1. Birds.

To qualify in this subject, the following requirements must be met:

(a) Identify Wild Birds in the field.
(b) Identify Wild Birds in the field, by note.
(c) Keep a record of time of arrival with comments on the numbers seen and habits of the Birds.
(d) Make a list of Birds of value to the farmer.
(e) Make and place at least one Bird House which is occupied during a season by Birds other than English sparrows.
(f) Take under your observation the nest of one pair of Birds (not the English sparrow). Give them all the protection you can and report what you observe of their life history.

BIRDS

CHARTING HONORS AND HONOR BADGES

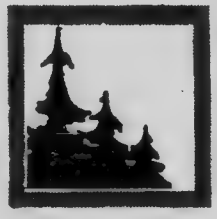
	"A"	"B"	"C"	"D"	"E" & "F"
1st. Red...	100 Birds	50 Birds	50 Birds	20 Birds	As above
2nd. Blue...	70 "	35 "	35 "	20 "	"
3rd. White.	40 "	25 "	25 "	10 "	"

2. Trees.

(a) Keep a record of forest and orchard Trees and Shrubs identified, stating location and commercial uses.
(b) Make a collection of various kinds of Woods.
(c) Know how to prevent the spread of forest fire.

CHARTING HONORS AND HONOR BADGES

		"A"	"B"	"C"
1st. Red	75	Trees	60 Woods	Test
2nd. Blue	60	or	25 "	"
3rd. White	40	Shrubs	.....	"



TREES & SHRUBS

3. Flowers.

(a) Keep a record of Wild Flowers identified, stating location.
(b) Make a collection of Wild Flowers, Ferns and Grasses (to be mounted and named).

(c) Transplant and grow in garden or window box, Wild Flowers, Ferns or Grasses.
(d) Know the principles of fertilization of Flowers.
(e) Describe and name Noxious Weeds.

CHARTING HONORS AND HONOR BADGES

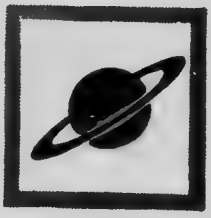
	"A" Wild Flowers	"B" Ferns, etc.	"C" Ferns etc.	"D"	"E" Weeds
1st. Red.....	100	75	15	Test	20
2nd. Blue.....	75	55	10	"	15
3rd. White.....	50	40	5	"	10

4. Stars.

(a) Locate and name Constellations.
(b) Locate and name Stars.
(c) Have a general knowledge of the position and movements of the Sun, Moon, Stars, Planets, Meteors and Comets.
(d) Make a Sun Dial that works, and take the latitude from the Stars with home-made instruments.

CHARTING HONORS AND HONOR BADGES

	"A"	"B"	"C"	"D"
1st. Red	30 Constellations	30 Stars	Test	Test
2nd. Blue.....	20 "	20 "	"	..
3rd. White.....	10 "	10 "	"	..



Charting Honors for Woodcraft may be won by qualifying in any one of the four sections listed above. The plan of the alternative programs is that one may be taken each year.

III

Arts, Crafts and Hobbies

THE desire to make something is instinctive. Watch a group of men or boys even when idling. Some will be making a rude sketch with a stubby pencil. Others will be whittling or carving. This desire to create something is one

of the things which has helped to elevate the race from barbarity to present-day civilization. The savage made rude tools and implements which formed the basis for development into the splendid things of this kind we have to-day. It is a long way from the mud hut to the sixty-story sky-scraper. The difference is a matter of degree in the development of that same desire to construct.

The fact that this desire to make things is a natural one gives it a place in any program of complete development. It is a barometer to our capacities and tendencies. It is also a source of pleasure. Many a man to-day comes home from the office or shop and goes to the cellar or climbs the attic stairs and spends hours of real enjoyment producing some work for the mere joy of making it. Many a boy spends days, perhaps months, in constructing a wireless outfit, a telephone, a piece of machinery, an article of furniture, a piece of carving or burnt wood or numberless other things.

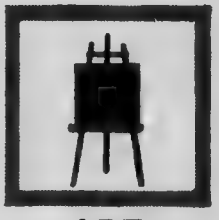
This should be fostered and developed. Great inventions have come in this way. It is one of the most natural sources of pleasure for boys of any age.

Every boy likes to make things of some kind or other, or is interested in some hobby. It may be different from the things other boys make or do, but it is something, the pursuit of which brings him real pleasure. Not only does it give pleasure but it also increases knowledge. One boy builds a rabbit hutch and in doing so learns elementary architecture. Another makes a battery and enters the threshold of science. Still another roams with a camera and enters into the world of pictorial art. The thing we want to emphasize is that every boy should develop these natural tendencies for by doing so he will build into his life capacities

for usefulness and enjoyment in harmony with his natural gifts.

Arts, Crafts and Hobbies—Test

In sections 1, 2, 3 and in A and C of section 4 of this subject the work done must be submitted to the Local Board of Judges who will determine whether it is to be awarded Red, Blue or White Honors or rejected as not being of sufficient worth to merit Honors.



CHARTING HONORS AND HONOR BADGES

1. Art.

Freehand Drawing—Pencil drawings, cartoons, poster, calendar or book cover designs.

Draftsmanship—Mechanical, architectural or map drawings.

Painting—Water color, oil painting, poster or calendar design in color.

Sculpture—Clay or plasticine modelling, relief map.

2. Craftsmanship.

Cabinet Making—Draw plans, construct and place in home for practical use any two of the following: Book rack, glove box, jardiniere stand, foot stool, book case, table, desk, etc.

Aeronautics — Construct a monoplane, biplane, racing model, etc., to scale.

Industrial Crafts—Construct a rowboat, sail-boat, ice-boat, canoe, toboggan, skis, snow-shoes, tent or tepee. Make a mechanical model of wood, metal or other material.

3. Hobbies.

Any subject or pursuit of definite educational value in which a real and persistent effort is taken and which is developed along some special line or for some special purpose.

4. Photography.

A. Take, develop and print pictures of classes and kinds as follows:

Class (e). Interiors, architecture, specimens, still life, etc.

Class (f). Landscapes, marines, flowers growing in native haunts, etc.

Class (g). Portraits of adults, children, babies, pets, farm stock, etc.

Class (h). Wild animals, birds, fishes, reptiles, etc., in native haunts.

Class (i). Street scenes, pictures that tell a story, swiftly moving objects, etc.

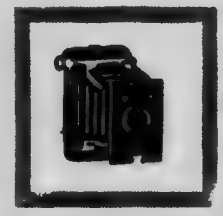
B. Take, develop and print or enlarge pictures and have them accepted for showing at a public exhibit.

C. Make an enlarging apparatus and enlargements with it, at least 5″ x 7″ in size.

D. Learn the elements of pictorial composition, the use of line, mass, light and shade, balance, harmony, atmosphere, simplicity, etc.

CHARTING HONORS AND HONOR BADGES
(Photography)

	"A"	"B"	"C"	"D"
1st. Red....	12 pictures including 5 classes.	3 pictures	2 enlargements	Test
2nd. Blue...	12 pictures including 4 classes.	2 pictures	.....	....
3rd. White..	12 pictures including 3 classes.	.....	.....	....



PHOTOGRAPHY

IV

Public Speaking and Current Events

HERE'S to the TUXIS BOY who can make a speech!

"Huh!" says someone, "that's easy! Any 'boob' can get up and 'shoot' off his face!"

Aha! but can he? Did you ever see some "boob" try it and blow up after the first dozen words? You had a great laugh on him!

In order to make a fairly successful speech, what powers must a fellow have? He must be able to handle books and magazines in order to get something to say on his subject. He then must arrange that material in the best order to make his speech strong and to write it out in clear, simple language. He must then memorize it and finally he gets up to deliver it, which is the real test. Here he needs to be able to fix his mind upon what he has to say and to keep it there. If not, he will think about the audience, his mother or his young lady friend in the front seat, or he will worry for fear he should forget and then his tongue stumbles, his knees tremble and his great speech ends in a fizzle. It is no easy task to undertake learning the art of public speech and it is worthy the effort of any live lad.

In his after life, every boy will find that the ability to express his thoughts in words clearly and easily will be one of his greatest assets. In ordinary business life, at Board Meetings, Committees, Lodge Meetings, Political Gatherings and in everyday social conversation, this power will be a great aid to his happiness and success. It is worth while, boys. Master it!

Public Speaking and Current Events—Test

All talks under this heading should be given before a group of at least four persons, should be executed in a creditable manner and should be at least of five minutes' duration. The following are suggested types. The number required within a year's time is indicated in the table given below.

A. A set speech.
B. Review of Events of the past month.
C. Participate in a Debate.
D. Review a book.
E. Report the result of personal observation of the habits

of birds or animals, growth of plants, processes of manufacture, places of historical interest, etc.

CHARTING HONORS AND HONOR BADGES

	"A" Speeches	"B" Reviews	"C" Debates	"D" Reviews	"E" Reports
1st. Red.....	5	6	3	3	3
2nd. Blue.....	3	4	2	2	2
3rd. White....	1	2	1	1	1

V

Home Reading, Trips and Lectures

SOMEBODY has said that a good book is better than a good man, because it is the best part of a good man! Perhaps that is an extreme statement, but anyway a good book is splendidly worth while. And what of a book that isn't good? Why, it isn't worth reading at all, for there are thousands of fine, interesting, helpful books that you are never going to get time to read, and every useless book you waste time on is shutting out a good one. The TUXIS BOY who hasn't become acquainted with Ivanhoe, and Nicholas Nickleby and Treasure Island and Robinson Crusoe has missed a great deal. And then think of the delight of reading the stories of those real men (and women too) who have done great things—Sir Francis Drake, Lord Nelson, Napoleon and Wellington, Wolfe and Montcalm, "Chinese" Gordon, Livingstone, Gladstone, MacKay, Paton, Lincoln, or some of our great Canadians such as Lord Strathcona, Joseph Howe, John A. Macdonald, Bishop Bompas, Robertson, MacDougall and others. Dry stuff, you say? Just try them and see! Or read Scott's "Lady of the Lake" or Tennyson's "Idylls of the King" and find out why thousands of readers the world over still love to read these great works.

Read a good magazine and at least one newspaper. No TUXIS BOY can afford to be ignorant of what is going on in the world right now. We are making history. Take notice of it as it is made and be ready to help make it right.

And then every trip you take may teach you a good deal. When you go to an exhibition, get the worth of your money in seeing things that the management have spent thousands of dollars to procure. Or if you get a chance to look over a great manufacturing plant, do not miss it. Some day you may need the very information you have now within your reach and anyway you will be a bigger man if you know how other men work and what they are doing for the world.

If a lecturer comes your way hear what he has to say and out of his special experience and knowledge train yourself for clearer thinking and better work.

Some people say that they can estimate accurately the character of a boy by the use he makes of his leisure time—the books he reads, the place he goes to, the entertainments he seeks. Is it true? Then what estimate would be formed from your reading and trips and the public meetings you attend?

Home Reading, Trips and Lectures—Test

A. Read Books from the following classes during the year: Biography, history, fiction, travel, science, poetry.

B. Visit some modern farm or industrial plant away from one's own locality.

C. Attend Educational Lectures, (University Extension, Travel, etc., etc.)

D. Read the Newspapers regularly and subscribe for at least one Technical or Farm Magazine.

CHARTING HONORS

	"A"	"B"	"C"	"D"
1st. Red.....	12 Books	3 Visits	3 Lectures	Test
2nd. Blue.....	9 "	2 "	2 "	"
3rd. White....	6 "	1 "	1 "	"

VI

Sex Education

EVERY TUXIS BOY should train hard to keep himself in the very best of physical condition, not only for his own sake, but for the sake of the generations that will succeed him. When a boy becomes a man and marries he passes on to his children not only the inheritance of health and strength which he has acquired, but also his standards and mode of living. If a TUXIS BOY has acquired the health habits suggested under the Program of Health Education in all probability his children will establish similar habits and will be as strong and healthy as their father. This privilege of being a partner with God in the creation of life should bring to all of us a realization of the sacredness of parenthood.

While a TUXIS BOY is not old enough to be thinking much about marriage, he should have the ambition to some day own a beautiful home and be surrounded with a loving family. The instinct that stimulates his imagination to picture such a delightful future is known as the sex instinct and it should be a great blessing in his life. Sometimes it is not. It all depends on how it is controlled. In a well-trained TUXIS BOY, the beauty and wonder of it arouses a tenderness and a protective instinct toward all women and girls. We are inspired with

a reverence for motherhood and we begin to appreciate the sacredness of fatherhood.

The best book for the Mentor to read to a Square of TUXIS BOYS on this subject is entitled "Keeping in Condition," written by Harry H. Moore. It is clean, inspiring and gives the information that every TUXIS BOY should have in a most readable and wholesome way.

Mr. Moore says: "The Sex instinct may be compared with various natural phenomena. Fire, for instance, is a great blessing to mankind. It warms our houses, and cooks our food. But if it gets beyond control, it may cause ruin. It is a fine thing to have temper; to be capable of becoming angry. It adds a certain desirable quality to the courage and the will-power of man, but a man must control his temper or it may some day control him and, under its control, he may commit an act he may ever after regret."

The Sex Instinct must be controlled and directed into helpful activities. The boy who throws himself with whole-hearted enthusiasm into team games, swimming, athletics, woodcraft, his school work, public speaking, arts, crafts and hobbies, music, Church and Sunday School work, gives this great force within him a chance to develop him into the highest type of manhood.

Sometimes this mighty instinct asserts itself so strongly that he is tempted to gratify it by association with immoral women and girls. The boy who thus gratifies his lower nature, debases the greatest gift that God has given him, the capacity to love, and he brings himself to the level of the beast. Sometimes a boy confuses love and lust. Each is centered in the Sex instinct. The trend of one is upward and God-ward, the other savors of the animal life.

"To every one there openeth,
The high way and the low;
The high soul climbs the high way,
And the low soul gropes the low;
And in between on the misty flats
The rest drift to and fro.
And to every one, there openeth,
The high way and the low,
And every one decideth,
The way his soul shall go."*

For some boys to live clean means hard fighting. The sex passion so hot and fierce calls forth the biggest fight of a life-time, a fight in secret without applause, a fight requiring will power and persistence. But to the boy who wins, there is a new force that brings a richer and more abundant life with a greater capacity for love and a physical strength which will enable him to achieve great victories.

TUXIS BOYS should regard all girls as future mothers of the race and bow in reverence before their self sacrifice. Many a boy has been inspired to great achievements by a wholesome, winsome girl. A TUXIS BOY will treat every girl as he expects other fellows to treat his own sister.

There is considerable information that every TUXIS BOY should have regarding these great facts of life and one of the best methods to secure this information is to have your father or the Mentor of your TUXIS Square read the Fourth Chapter of "Keeping in Condition." Knowing the facts that are revealed in this book, a TUXIS BOY who is true to his name will resolve that he will give his future wife as clean a life as he expects in her. Just as he believes in fair play and despises cheating in baseball or hockey, so as a matter of fair play, he will adopt for his own life the same standards he demands in the girl he will some day marry.

*By John Oxenham in "Bees in Amber."

Sex Education—Test

Attend two meetings where one of the following books is read by the Mentor for Blue Honors or read one of the books privately for White Honors:

"John's Vacation," W. S. Hall.

"From Youth Into Manhood," W. S. Hall.

"Keeping in Condition," Harry H. Moore.

While any of the above books are suitable for TUXIS BOYS they are especially applicable, in the order named, for boys fifteen, sixteen and seventeen years of age respectively.

CHAPTER III

PHYSICAL PROGRAM

"Jesus increased in....stature...." *Luke 2: 52.*

"Thou shalt love the Lord thy God....with all thy strength...." *Luke 10: 27.*

YOUTH is the time of abundant energy. Nature is lavish with health and strength at the time when the structure and functions of the body are rounding out into complete manhood. It is the time to be hearty, free and open in manners, to be possessed with a desire to excel in all one undertakes.

It is a fine thing to be interested in all forms of exercise which will result in a ruddy cheek, clear eye and a strong, flexible voice. Athletics and games have an undoubted and important place in furnishing healthful exercise and in pro-

viding a wholesome outlet for the full, free energy of youth.

Older boys who enjoy all kinds of outdoor life, who delight in competition which involves victory and fatigue, who take pleasure in all movements which call for rythm and vigor, seldom are victims of habits of which they need feel ashamed.

Enough has been said to show that we have no right to despise the body. It has its rightful and important place as one of the four phases of our nature. If we set as our final goal the mental and moral gains, which we may achieve through good health and well developed muscles we shall reap a double reward for our efforts.

Many older boys who desire to be clean and straight morally are failing to make good because they have neglected to reckon with their physical life as a vitally important factor in good morals. The Creator never intended that we should try to carry on our morals that which we should carry on strong, firm muscles. Good health is a great mainstay to our mental, moral and physical life and upon it we depend largely for our ability to serve our fellowmen.

"Jesus increased in stature," is the only word we have about the physical development of the Master—but we dare not think of Him in terms other than of One with a splendid physique. We may infer from the type of hill country in which He spent His boyhood and from the trade He learned and mastered that He was more than ordinarily well developed physically.

Jesus lived constantly in the open air. He made long, tiresome journeys on foot. He was able to endure both physical and mental strain under which most men would have quickly broken down. Jesus' remarkable courage is best accounted for by the belief that He possessed an exceptional

physique. A weak man may show a measure of courage under the stress of some special circumstances, but in order to face openly powerful enemies for a period of a year or eighteen months as Jesus did would require more than ordinary physical powers.

He also recognized the place of the body in His work and teaching. He cared for it, healed it, cured it of its diseases, relieved its sufferings and provided for its needs, as in feeding the multitudes. In His teaching he gave it its proper place, recognizing its function and needs in foodand clothing.

"The body," he pointed out, "is more than the meat," but on the other hand, "the life is more than the body." The physical is important therefore because of its spiritual relationship. The spiritual life is not limited to one part of the man, but is the whole of man, is all sides of his nature in relation to God. "Thou shalt love the Lord thy God with all thy strength," *i.e.*, with all thy physical powers. To be spiritual therefore, on the physical side is to conform to God's laws for the body; the physical life has a spiritual significance; it, too, is God's.

Good health is the ideal for the physical life and every right-thinking older boy will recognize that not only his own life is involved but that the well-being of future generations depends on the quality of his manhood. Every child has a right to come into the world well-born, sound in body and sound in mind, and if through any fault of ours they start life with any sort of handicap, a weakened constitution, a disease of the body or mind, a wrong has been done them which nothing on earth can ever undo.

The following suggestions for training in "Health Education," *i.e.*, seeking to know and obey God's

laws for the body; "Camp Craft," *i.e.*, learning to live as Jesus did, out in the great out-of-doors with the God of the open air; and the various games and athletic exercises are intended as a help to Canadian men and boys to attain the Christian ideal for their physical life.

I

Health Education

THREE men, one a business man, one a minister, the third a Y.M.C.A. Secretary, all in the prime of life, had found their places in the world and were doing man-sized jobs, and then, in fairly quick succession, three obituary notices appeared and there were three large places to be filled in their community.

Why? Because they had "cracked." They had put into life a greater stress and strain than their physical machinery would stand. Their lives were like pitchers of water on a cold morning, which have been cracked by the expanding ice and are rendered useless. Their work stopped. The thing which lay nearest their hearts they left unfinished.

Why? Because as growing boys they had not formed health habits which are the foundation for a healthy and vigorous, yes, even strenuous life in later years. Their development was incomplete. Their usefulness was marred. They fell short in their life's work because of the lack of complete health.

In by-gone days when much heavy manual work had to be done, men developed into physical giants. To-day there is not the same necessity for we have machinery to do this heavy work. What we need, however, is a healthy body which can stand up under the strain of life to-day. If we are to enjoy life to its full and reach our best

endeavor there must be that complete health. Just now is the time for you to start forming habits of health which will build up a physical organism equal to the tasks of life. Without that, life is not complete. It will not be full. It will fall short of the mark in usefulness.

The Health Habits suggested below may be observed by any boy and will bring to him not only in the present but in the years to come dividends of health, satisfaction and enjoyment which are incalculable.

Health Education—Test

1. Health Habits.

(a) Have a fixed hour for rising and retiring.
(b) Drink at least one glass of cold water upon rising and frequently during the day.
(c) Cleans the teeth at least twice daily.
(d) Practice of daily physical exercises.
(e) Take sponge, tub or shower bath each morning.
(f) Kybo. "Keep your bowels open."

2. Health Knowledge.

(a) Attend a practical talk on Health, Care of the Body, Prevention of Disease, etc.
(b) Have a thorough knowledge of some standard book on Health Hygiene.
(c) Understand the Effects of Alcohol and Tobacco on a growing boy.
(d) Know something of the relative value of different Foods; how to tell what to avoid, etc.

3. Health Tests.

(a) Pass Endurance Test according to Class—Pull up, Relay Message, 18 ft. Rope Climb, One Mile Walk, Cross Country Run or Paper Chase.
(b) Maintain good posture, have a medical examination, and have no remediable physical defects uncorrected.

(c) Plan to follow the Health Habits outlined above so that it will be unnecessary to be absent from school or business through any preventable illness.

CHARTING HONORS AND HONOR BADGES

	Sec. 1	Sec. 2	Sec. 3
1st. Red.....	10 months	4 required	3 required
2nd. Blue.....	8 "	2 "	2 "
3rd. White.....	6 "	1 "	1 "

II

Campcraft

A SOLDIER some time ago returned from overseas was talking about his experiences, when he said: "I have always been very much interested in the way that the different boys took care of themselves. When we'd move into new billets, or, sometimes, stop for the night with the twinkling lights of heaven above us, I noticed how easily some of the boys made themselves comfortable. Others never seemed to be able to quickly size up an old building or a bit of ground nor fix up a warm and comfortable bivouac. I have been thankful many and many a time for the camping experiences that I enjoyed with the bunch of us who paddled day by day among the islands and camped by night among the rocks and pines on the Lake of....."

To have a working knowledge of Campcraft is an excellent attainment. Every red-blooded boy likes to "rough it." Yet if you know how to do it, you can be as comfortable as in the best hotel.

Nothing will help to make you resourceful and as "hard as nails" like pitching and striking camp with Nature close at hand as your assistant. It is a time when the boy who knows how to camp in comfort

is a real asset to the group. It is a time when the spirit of help the other fellow has a great chance for expression as the boys in your group spend the nights around the fire among the noises and silences of Mother Nature.

It surely is a great experience to have the sun-touched drip and flash of the paddle or the breeze-blown odors of the long trail in your memory as you stop in the evening at some grassy, tree sheltered camp site. It's great to see the fellows put up the tent among the trees while you rustle some balsam boughs and spread the blankets on them. My, but those beds will feel good! It's great to hear the crackle of the first small bits of wood taking hold of the fire, with the smoke, a hazy slate color, drifting up through the trees as one of the bunch works his hatchet on the dry, splintery boughs; when the call to "eats" is heard, to dish yourself up a plate of beans steaming in the cool air, a few strips of crisp bacon, toast browned by the open fire with that smoky tang that only camp-fire toast can claim, and steaming coffee, with the other good things that the cook in the crowd prepares ready for a hungry group; to tell those jokes that the fellows know around the blazing camp fire at dark or hear the story of the early days that the Mentor recounts; or, perhaps, to just sit quiet for a while watching the fire figures in the centre of a happy circle and hear nightly the voices of Nature that surround you. What experience can beat that of camping for a group of real live TUXIS BOYS—that is, when you understand camping in comfort—Campcraft.

Campcraft—Test

A. Sleep outdoors under canvas within twelve months.
B. Build a camp fireplace and cook, with ordinary camp outfit, digestible meals for at least two persons.
C. Go on an over-night or over-the-holiday camping trip.
D. 1. Put up a tent and trench it properly.
2. Make a comfortable bed of wildwood material.
3. Light fifteen fires of wildwood material with fifteen matches in different places, one of which must be on a wet day.

4. Build an open fire of wild material in wind and rain.
5. Build and light a fire and boil one quart of water in a two-quart pail in fifteen minutes with one log, one match and an axe.
6. Make a tent.
7. Make a fire with fire drill or rubbing sticks made of material of one's own gathering.
8. Make pot-hooks or other devices for holding frying pans, etc., over a fire.
9. Demonstrate how to pitch a tent on a rocky place and on sandy soil.

CHARTING HONORS

	"A"	"B"	"C"	"D"
1st. Red.....	30 nights	15 meals	5 trips	All 9
2nd. Blue.....	20 "	10 "	3 "	6 out of 9
3rd. White....	10 "	5 "	1 "	3 out of 9

III

Team Games

WELLINGTON is reported to have said: "The Battle of Waterloo was won on the playing fields of Eton." By that he meant that the boys who had learned to "play the game" at Eton

became the officers and men who won one of the decisive battles of history. What had they learned? In their games and sports, they had gained the ability to think and to decide quickly; to drive muscles into action at the immediate command of the will; to depend upon themselves in an emergency; to hold their forces in check until the right moment should arrive. They had sharpened their senses of sight and hearing; they had been taught to use their brain as well as their brawn; and, most important of all, they had learned to work together as members of a team; to give the other player a chance and even help him to make good; to be more anxious for the success of the team than to shine for themselves as "star" players.

A young Canadian officer wrote home from France that it had taken more courage for him to work his way through college than to "go over the the top." The boys who will win out in the battle of every-day life are the ones who have played Team Games and played them hard, fairly and in co-operation with other players. Every TUXIS BOY who plays the games of this Program in the right way is helping to win the great "Waterloo" of his life some day later on.

Team Games—Test

Show reasonable proficiency in at least two team games. Play at least ten games throughout which you exhibit self-control, gentlemanly conduct and good spirit.

CHARTING HONORS AND HONOR BADGES

1st. Red	20	games of	4 kinds
2nd. Blue	15	"	3 "
3rd. White	10	"	2 "

IV

Group Games

"SHUCKS! If Jack and Charlie had turned up we might have pulled off *some* kind of a game of baseball but you can't do anything with five men. However, the other fellows have only got seven, so they're not much better off," and with a look of disgust the captain of a TUXIS Square Team began to gather up bats and mask and the other equipment that goes with the game.

"It sure looks as if baseball is canned properly for to-night. This is our meeting night, too. Wonder what we can do?" asked his chum.

"Its rotten luck all right, but I'll see Mr..... We could play a transportation relay,or skin the snake and those other games we played two weeks ago. We had a great time then, do you remember?"

"Yes, that's right, and he told us any number could play most of them and learn them quickly."

The two set off to the Mentor who was talking to some of the visiting team and in a few minutes the odd man was transferred to even the teams and the bunch were having, as one of them put it, "a whale of a time."

Perhaps your group has been up against the same condition. Or if they haven't, the chances are pretty good that they will be. That is the time when a knowledge of some Group Games is worth having.

They differ from organized team games, like baseball and hockey, in that any number can play

them. You can take the group you have and with most of the games start right in.

Then, if your Square meets in a small town or rural district where playing equipment may not be handy, the Group Games are the real thing, for you can play the most of them without any equipment at all and all of them with very little.

Anybody can play them. The fat or the thin, the Mutts and the Jeffs—all can take a hand in Group Games and put up a good game without the hard practice necessary in team games. Yet they develop the team spirit too, just the same as the organized games and if your bunch start playing the different games and stunts in the TUXIS Program you will help build up a splendid Square-spirit—everybody pulling together for the good of the group.

You know, too, although they are so easy to learn and play yet they have plenty of "pep" and starch in them. The man with the physique and the man with th grey matter has to use it just the same as in the big game. And, of course, you give and take your bumps—they are part of Group Games too—and it all helps to develop strong character when the team spirit is good.

To know these stunts and games will help you to develop the spirit of sociability in yourself and the group.

In the winter, when you are out at that indoor party and things are inclined to drag a bit, a few of the milder games will keep everybody happy. Just as the TUXIS Program is a help to develop the qualities of leadership that Canada needs in her boys and men, so will the ability to play Group Games, to play them hard and fair, help to develop the quick-acting brain, the decisive mind, the ability to take hard knocks standing up, and the generous spirit that must be part of the man who would be a leader.

Group Games—Test

Take part in playing Group Games and be able to name and describe them in such a manner that others may learn to play them.

CHARTING HONORS

1st. Red.....50 games
2nd. Blue.....35 "
3rd. White.....20 "

V

Aquatics

"THEY went out in a canoe and neither of them could swim."

"There was no one close at hand who was sufficiently well acquainted with a knowledge of life-saving and resuscitation to attempt a rescue."

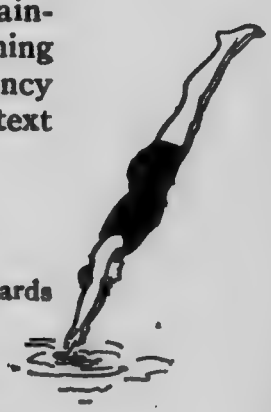
These clippings were taken from one issue of a Canadian paper and so reads, in part, the sad story of the average drowning accident. We read something like this in our newspapers almost every day from May until September. Human life is the most valuable thing in the world and yet thousands of lives are lost annually by drowning. Most of these lives might have been saved if these folks had realized the importance of learning how to swim and if many of their friends had mastered the art of Life-saving.

No fellow's education is complete without a knowledge of Swimming and Life Saving. If education is training for complete living then one's education is not complete if it omits a knowledge of that which enables one to enjoy himself and at the same time preserve his own life and possibly that of his chum or friend.

Apart from its value as a means of self-preservation and enjoyment, swimming is an important factor in character building. It helps to develop will-power, self reliance and courage. It also is a splendid form of physical exercise, calling into play many large sets of muscles without bringing any undue strain upon any particular muscle. It quickens the circulation of the blood and promotes deep, rythmic breathing.

The interest being taken in Swimming and Life Saving is becoming very wide-spread and more people are learning these important arts than ever before. The Y.M.C.A. has taken a large place in the promotion of this work. In connection with their "Learn to Swim" campaigns during the year 1917 over 50,000 boys and men were taught to swim. In addition thousands were instructed how to swim better and, most important of all, 2,500 persons qualified for the Life-Saving awards. In every well-conducted boys' camp instruction in Swimming and Life-saving is one of the first and most important features of the program.

Proficiency in Life Saving and Swimming should be the aim of every boy in Canada. The tests are a little difficult but with a little practice and training, no difficulty should be experienced in obtaining the Honor Badges, as well as securing the Proficiency Certificate, details of which can be found in the text book of the Royal Life-Saving Society.

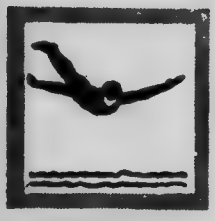


Aquatics—Test

Grade 1.—(a) Swim 100 yards on the breast and 50 yards on the back.

(b) Demonstrate the rescue and release drills on land, and the Schafer method of resuscitation and the promotion of warmth and circulation.

(c) Demonstrate four methods of rescue and three releases in the water. The third or fifth method of rescue may be used, the other three are compulsory. The drowning subject in the rescue methods must be carried at least 10 yards.



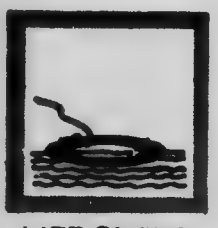
AQUATICS

Grade 2.—(a) Swim 150 yards in three styles (breast, back and crawl strokes) and 75 yards on the back, and dive from the surface into not less than eight feet of water and bring up a weight of not less than five pounds.

(b) Demonstrate on land the five methods of rescue and three methods of release and the Schafer method of resuscitation.

(c) Demonstrate the first and second method of rescue and release combined in the water, towing the person a distance of not less than 60 feet.

Grade 3.—(a) Swim 175 yards any style and 100 yards on the back and dive from the surface and bring up a weight of not less than five pounds.



LIFE SAVING

(b) Demonstrate on land the five methods of rescue and three methods of resuscitation.

(c) Demonstrate the first and second method of rescue and release combined in the water, towing the person a distance of not less than 60 feet.

CHARTING HONORS AND HONOR BADGES

1st. Red	For qualifying in	Grade	3
2nd. Blue	"	"	"	2
3rd. White	"	"	"	1

VI

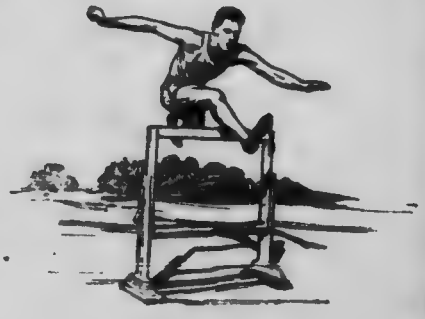
Athletics

EVERY TUXIS BOY should be anxious to compare his ability in Running, Jumping or Throwing with that of other boys about his own age and weight. The old plan of competitive Athletics in which the only object was to beat the other fellow was unsatisfactory. It gave encouragement to the few who could excel in one or more events—and these few were those who needed the physical development least. The new plan is to challenge every boy to measure up to a good all-round standard in every event even if one does not excel in any.

Athletics have many splendid values for the TUXIS BOY whose aim is the development of all-round character. They help to establish self-control, temperance, courage, perseverance, self-reliance and other clean-cut, manly virtues. They teach the muscles to obey the will. They instil those qualities which tend to keep one steady in the midst of danger.

TUXIS BOYS who are strong, robust and have a reserve force of physical power which naturally leads them to take an active interest in all physical activities may use Athletics as a splendid means of service to the sickly fellow with narrow chest, lacking in stamina and muscular control.

If competitions are organized on a group basis so that every member adds to the total score made by the Square, backward boys will feel that the forty or fifty points they may make, while not much in itself, will in any event bring up the average. They will be led to participate and do their best



and incidentally discover that they are able to make a very good showing in one or more of the events.

The Athletic Competitions of TUXIS Squares should be planned to take in every member, those who are backward as well as those who are proficient. So that they will do the greatest good to the greatest number and especially to those who are most in need of the training and physical development.

Athletics—Test

There are two running, three jumping and three throwing events. Complete scoring tables and rules for the conduct of the events in this section will be found in Chapter XIX. Boys are graded into classes according to age and weight and the points given for their performance will be according to the class they are placed in after their weight and age have been taken.

In order to secure Honors in Athletics, TUXIS BOYS must compete in each of the eight events listed and gain an average of 70, 80, or 90% of credits. Thus if the required average is not secured in one event it may be made up through an especially good record in another event.

CHARTING HONORS AND HONOR BADGES

1st. Red.....	Average	90%	of	points	in all events
2nd. Blue.....	"	80%	"	"	"
3rd. White.....	"	70%	"	"	"

RUNNING

JUMPING

THROWING

CHAPTER IV

DEVOTIONAL PROGRAM

Jesus increased....in favor with God....Luke 2: 52
Thou shalt love the Lord thy God with all thy heart....
Luke 10: 27

RELIGION has had universally to do with cultivation of the heart life of man *i.e.*, the emotional, nature. Too often in the past, the emotional element has been discounted, and has been more or less apologized for. Christ and the Bible clearly teach, however, that the affections and sentiments, the feelings and desires, are the very centre of personality. They emphasize the importance of the cultivation of love, affection, awe, reverence, gratitude, etc., etc. What would life be worth without the rich endowment of the emotional nature? If the heart desires are wrongly directed, we become slaves of passion; if rightly trained, strong and noble men.

Jesus gives us the perfect example of fully-developed manhood on the religious and emotional side of life. How rich was that life; how tender

His compassion; how deep His reverence; how broad His sympathy; how complete His trust; how warm His friendship; how unblamable His indignation; how sincere His sorrow; how unflinching His courage; how patient His endurance of pain; how high His sense of perfection and how true His appreciation of the beautiful!

In His teaching, no less than in his life did Jesus recognize the importance of the desires and feelings. His ideal of the emotional life is perhaps best expressed by the word "beauty" or "perfection." He appreciated the beautiful whether in nature or man. "Behold the lilies of the field," "Be ye perfect as your father is perfect," expressed the joyous admiration and aspiration of His heart. He entered heartily into the Temple Worship and delighted in the ideals of beauty and perfection expressed in the Psalms of Praise, *e.g.*, "Worship the Lord in the beauty of holiness," "Out of Zion the perfection of beauty." The church, too, in her teaching and practice has been true to this fundamental principle in life. By all the arts at her command, she has endeavored to cultivate the heart life of man, using in her simple, yet stately services of worship, scripture, prayer, ritual, responses, music, poetry and art to deepen and strengthen man's religious and emotional nature. If it is important that we spiritualize the physical and intellectual side of our life and relate them to God, how much more important that we also seek to spiritualize the heart life too, and consecrate all its rich and abundant powers to Him as Jesus did. That man is spiritual on the emotional side of his nature, therefore, who brings his feelings and desires under the control of Christ and is giving them full expression in his service.

It will be observed, however, that the sections of the Devotional Program have to do only with the environment and conditions of religious experience. The importance of the "Church Services of Wor-

ship," the "Sunday School" for Bible Study and the habit of the "Morning Watch" for Daily Bible reading and prayer can scarcely be over-estimated. Now is the time, too, when TUXIS BOYS will begin to get a deeper insight into the inner meaning of things, hence the appropriateness of an appeal for a spiritual interpretation of music, poetry, art and nature during these years.

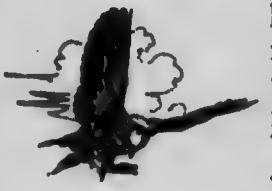
It is highly important for TUXIS BOYS to remember that they are passing through the years of largest expansion for the emotional nature, during which the high water mark of religious awakening is reached. No boy or young man ought to pass through these years so responsive to every emotional appeal and so sensitive to religious impulses without the privilege of coming to know and choose Jesus as his Saviour from sin and short-coming, and as the Lord and Master of his life, and of publicly acknowledging Him by entering into the full privileges of church membership.

I

Church Worship

A BOY, standing in solemn silence on the shore of some lake encircled by the forest and watching the moonlight on its surface, says, "Surely God must enjoy beautiful things, to put this here where, for years, no one has seen it but Himself"; that is worship. An astronomer points his telescope to the sky and finds that the planets are moving exactly as he at his desk had estimated they would move; then he flings open his observatory window, leans out, looks up to the sky and exclaims, "O

God! I am thinking Thy thoughts after Thee"; that is worship. Agassiz, the great scientist, said that the man who studies the rocks of the earth "moves along paths worn deeply by the divine footsteps"; that is worship. A boy of seventeen sits in church; the tones of the organ quiet him; the prayer of the minister makes him search his heart to see if he is keeping it true to his ideals; he remembers that the church in all the world has helped, as nothing else, to make honor and morality live and thrive; he sees his neighbors worshiping with him; the hymns and the sermon send him away feeling that God needs his boyish life in carrying on His Great Work in the world; that is worship—the kind that every TUXIS BOY needs and may have.



"Back of the loaf is the snowy flour,
And back of the flour the mill;
And back of the mill are the wheat and the shower,
And the sun and the Father's will."

Church Worship—Test

A. Attendance at one service a Sunday at least.

B. Know something of the author and circumstances under which great hymns were written.

C. Systematic and proportionate giving. Some definite amount for every Sunday of the year.

D. Talk at Mid-week Session on "The Value of Worship."

CHARTING HONORS

	"A"	"B"	"C"	"D"
1st. Red	50 Sundays	12 Hymns	Required	Attendance
2nd. Blue	45 "	8 "	"	"
3rd. White	40 "	4 "	"	"

II

Church School

A CERTAIN man has a most interesting game that he likes to play with a roomful of young people. He asks them to call out the names, one at a time, of great men who have done big things and are prominent in the public mind, and he undertakes to tell them of each man's Christian work in connection with the Church or Sunday School. He challenges them to see how long the game can go on until some man is named who is not an active, earnest Christian. When such a man is named, the game is over. The contest has often kept up until over fifty men have been named and the speaker has told of the Christian work that each man is doing. The big, worth-while men are, or have been, in almost every case, connected actively with the Church School.

Every boy who wants to round out his life, should attend Sunday School regularly and take an active interest in its work. He needs to know something about the Bible on which much of English civilization and literature is founded and about the teachings of his Church. He needs to gather with others of his own age as well as mature men and women and little children as a member of the Church School Army, the greatest army the world has ever seen. He will in a Church School Class, from a friendly, manly teacher, often receive influences that will shape his whole life for good.

Thousands of Canada's strongest, brightest, cleanest boys are lined up to-day with the Sunday School, proud to feel that they belong to it and that it belongs to them. Best of all, even when they become young men, they remain in the School and become its best officers and teachers.

Church School—Test

A. Attendance at Sunday School Session.

B. Test (oral or written) on the lesson courses.

CHARTING HONORS

	"A"	"B"
1st. Red	50 Sundays	90%
2nd. Blue	45 "	80%
3rd. White	40 "	70%

III

Church Relationships

TUXIS BOYS have reached a time of life when they must begin to assume larger responsibilites in relation to their church. The church has nurtured them and contributed much to their lives from their earliest days. Now TUXIS BOYS must contribute to the church life so that it may continue to do the same for others.

The Christian Church occupies a place of first importance in every Canadian Community. TUXIS BOYS should understand what a great factor the church is and what it contributes to the community life of to-day. The Christian Church has been a powerful factor in all history since the days of its founder. TUXIS BOYS should know something of the Church's history.

In Church life to-day there are many important departments of work. TUXIS BOYS should be familiar with the work of these departments in order that they may support them with their money, prayers and service and take part in the extension of these movements and the projection of new plans in the future.

The annual reports of the Church Colleges, Relig-

ious Education, Social Service, Home and Foreign Missionary Departments, etc., of the denomination might well be brought before the members of each TUXIS Square for review and discussion. In this way every boy will gain an intelligent appreciation of the larger work and plans of the great Church Organization of which he, as a member, is an integral part.

The personal relations of boys to Christ and the Church, the meaning of the sacraments and other vital features of Church life may well be made the topic of special sessions which shall contribute to a better understanding and a fuller appreciation of the place and function of the Church.

Church Relationships Test

Attend a series of practical talks on: "The Meaning of the Sacraments," "The Place of the Church in Modern Life," "Church History" and reviews of the work of the Social Service, College, Religious Education and Missionary Departments as found in their annual reports.

CHARTING HONORS

Red, Blue or White Honors, will be awarded at the discretion of the Mentor, in consultation with the Minister and will include personal relations to the Church, its Membership and Sacraments.

IV

Mid-week Bible Discussion

LISTEN, TUXIS BOYS, to the evidence of some great men.

John Ruskin, the great Englishman, says that whatever there is of merit in anything that he has written is due to the fact that, when a child, his mother made him familiar with the English Bible.

Daniel Webster, the great American, says, "If there is anything of eloquence in me it is because I learned the Scriptures at my Mother's knee." Count Tolstoi, the great Russian, testifies, "Without the Bible the education of the child to-day is impossible."

Dr. G. H. Ferris, a great preacher of Philadelphia, says that just so long as human beings have sorrows and sins, tears and tasks, so long will the Bible keep its power and beauty, and be enthroned in the human heart.

H. C. King, the great teacher, of Ohio, says that we need three things in order to make the most of life—Character, Influence and Happiness—and that these three can be gained by Bible study. W. T. Grenfell, the great medical missionary of Labrador, says: "I love the Bible. I believe it contains all necessary truth about the way a man should walk here below. To me it means everything. Take it away and you can have all else I possess."

In the face of these facts, no TUXIS BOY can afford to leave out of his life the mid-week, nor the Sunday, study of the Bible. Bible Study puts iron into the blood, courage into the life, strength into the will; it gives a deep, firm foundation for every purpose and plan.

Mid-Week Bible Discussion—Test

Attendance at Devotional Period of the Mid-week Session and passing an examination on ıe course of study followed during the year.

CHARTING HONORS

1st. Red	90%	in attendance	and examination	
2nd. Blue	80%	"	"	"
3rd. White	70%	"	"	"

Examinations will be conducted each year during April, by the Canadian Standard Efficiency Training Committee, on the courses listed below. A handsome certificate is presented to every boy who reaches the pass mark of 70%. Application for examination papers should be made before March 1st. These courses of study are suggested and may be secured from the C.S.E.T. Supply Depot, 120 Bay St., Toronto. Other courses of equal standard issued by the denominations may be used:

"The Life and Works of Jesus," W. D. Murray, 25 Lessons. Teachers' and Students' editions.

"Character of Jesus," Perkins, 10 studies. Teachers' and Students' editions.

"The Life of St. Paul," A. G. Leacock, 23 lessons.

"Jesus the Head Coach," B. B. Johnson, 13 lessons.

"Life Questions of High School Boys," Prof. J. W. Jenks, 15 lessons.

"Campaign of Friendship," F. M. Harris, 10 lessons. Teachers' and Students' editions.

"Paul, the All-round Man," Robert E. Speer, 12 studies.

"Christian Teaching on Social and Economic Questions Confronting Boys," C. C. Robinson.

"Comrades of Jesus," Perkins, 12 lessons. Teachers' and Students' editions.

"Personal Problems of Boys Who Work," Prof. J. W. Jenks, 15 lessons.

"Athletes of the Bible," Brink & Smith. 14 studies.

"The Manhood of the Master," Fosdick, 12 studies.

"Jesus the Leader," Koehler, 10 studies.

"Men of the Old Testament," L. K. Willman, 18 lessons.

V

Morning Watch

JESUS knew life and lived it to the full. He knew just the things that one should put into it to make it strong, well-rounded and complete. His beautiful spirit of love and service came because of the things he built into His. One of the first things that strikes

us in His private life was the habit of prayer. So often we read about Him going out early in the morning for this purpose.

Jesus kept what we call in our Program the Morning Watch. What does that mean? Why, starting each day with a few minutes quiet meditation and prayer—the reading of a little Scripture containing a message for the day. Could there be a better time than just in the morning quiet, after a recreating sleep, with another day of new opportunities for service just opening? The mind is clear and free from the distractions of the later hours. Is there a better way to start another day of growth and usefulness than to talk over with God the best way of spending it?

Is there any doubt about the value and real help of such a practice? The men who have accomplished most in life have been men of prayer who were also familiar with God's word. General Gordon, Gladstone, Sir Walter Scott, Livingstone, were men of this type. Every boy in training must keep close to the Master trainer. Jesus knew the real values of life and we must remember He found need of this in His training.

Bible reading in a haphazard way is never satisfactory. More help will be obtained if it is regular and follows some definite plan. A course of Daily Bible Reading entitled "The Morning Watch for TUXIS BOYS" is recommended. It is issued bimonthly and may be secured from the C.S.E.T. Depot, 25 cents a year. The Daily Bible Reading plan issued by any denomination may also be used.

The Morning Watch—Test

Form the habit of Daily Devotions, including Bible Reading and Prayer.

CHARTING HONORS

The boy's word of honor will be taken, and the Mentor shall determine the Charting Honors to be awarded. 90% Red; 80% Blue; 70% White Honors.

VI

Nature, Music, Art and Poetry

NATURE, Music, Art and Poetry—what a magnificent line-up, fellows! They are the allies battling in their silence for ideals that bring happiness to boys and men as surely as the booming guns of our Allies across the seas.

How do you feel about Nature? When you take a walk in the woods do you just see so many thousand dollars' worth of lumber or does the divine in God's out-of-doors speak to you through the breezes in the trees, the bees upon the flowers, and the songs of the birds? Do you simply know that there are stars up above each night or does the infinite work of God strike you as you look at suns and planets—worlds in the making, and think of the change and the order of the universe that envelops us?

What is your conception of Music? Is it of the lame-duck variety coined and sung on the vaudeville stage by those who care for nothing but the money it brings, easily heard and quickly forgotten, or is it of the wonderful harmonies produced by men like Beethoven or Mendelssohn of the past or Sir Edward Elgar of the present? They had messages that sprang from their very souls andw hich speak to us in the beauty of their melodies; messages which speak with greater power the more we hear them.

What do you know about Poetry? Have you just

passed it up altogether and fed your mind upon "How the Dare-devil Boys Sank the Submarine Single-handed," and others of its ilk, cheap in money but dear at any price, or have you caught an appreciation of the work of men like Tennyson and Longfellow and those of today who are speaking real messages to you through the rythm of their verse; messages that make a new appeal to the imagination each time they recur in the mind?

How about Art? Is the comic supplement the zenith of your approach to the wonderful world of Art or do the messages expressed through the brush of a Millet or Reynolds of the past or an Abbey of the present find an answer in your heart? Does the beauty of form in many of our modern buildings at home or in engravings of the wonderously beautiful cathedrals at Rheims or Amiens pass you unnoticed? Does sculpture speak its message in your mind? There is a great wealth of beauty in the art of the world ready to bring you profitable pleasure for your whole life to come—if you want to understand.

God has spoken to men and in answer to the Divine call from within they have poured out their best and spent their lives in producing beautiful music, charming poetry, chaste forms in art that will bring the same thrilling response into the life of a boy as came to these men and will stay with him to bless his old age, if he can appreciate and understand.

But, you say, I have tried and can't enjoy these things! If you have been fed on milk till now you can't digest strong food at once. If your imagination is stimulated and trained as a TUXIS BOY to take the strong food of the artistic world you will never go back to trash.

It's all a matter of cultivation, fellows. If you have never tried to see God in the works of man and

nature, your group will be laying up a treasure-store for your imagination by following the Program, not only for now but for all the years to come, and you will have a good time together through gaining a knowledge of the beautiful mysteries in the world of Nature, Music, Art and Poetry.

Nature, Music, Art and Poetry—Test

A. A practical talk on one of the subjects in this section should be attended each year. The following topics may be used:

"Man's Place in Nature"

"God's Plan of Work as Revealed through Nature."

"The Making of the Earth."

"The Development of Plant Life."

"The Development of Animal Life."

"The Place of Music in a Boy's Life."

"Standard Classical Musical Compositions."

"How to Look at Pictures."

"Painters and Painting."

"How to Judge Architecture."

"The Place of Poetry in a Boy's Life."

B. Identify and describe Two Standard Classical Musical Compositions and give a short account of the lives of the composers.

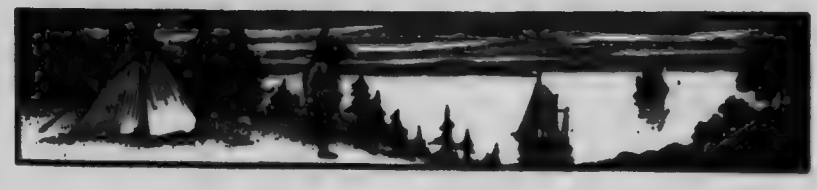
Identify and describe two famous pictures or reproductions of them and give a short sketch of the lives of the artists.

Produce a photograph, sketch or picture illustrating a famous piece of sculpture and an order of architecture, and tell something of their history.

Read before the group a poem of one's own selection and tell its merits.

CHARTING HONORS

1st. Red.....	Hear	Talk	and	pass	test	in four	subjects
2nd. Blue.....	"	"	"	"		two	"
3rd. White.....	"	"	"	"		one	"



CHAPTER V

SOCIAL PROGRAM

"Jesus increased in.....favor with....man." *Luke 2: 52*
"Thou shall love.....thy neighbor as thyself." *Luke 10: 27*

THE TUXIS BOY'S unfolding social nature creates a demand for ever-widening relationships. At this period the boy's life which has been centered in the home, church and school broadens to include community interests and a wider range of social life. He begins to consider definitely his life work and the place he may expect to fill in the world.

In all these aspects, it is of vital importance that the attitude of the TUXIS BOY should be one of Service. His questions should be: How can I help to carry some of the responsibility for the home life? How can I serve the community in which I live? What special training can I secure which will enable me to be a leader in useful activities? What line of life work will enable me to render the largest service to the world?

St. Luke tells us that "Jesus increased in favor with man" and the story of the years of His ministry

bears out in a striking manner the promise of the twelve-year-old lad. His helpful contact with individuals; His participation in social gatherings of various kinds and His multitudes of followers bear witness to the fact that His was a most attractive personality.

It is scarcely necessary to point out how Jesus demonstrates every phase of "good-will" in His life, work and teaching. He was a most diligent and efficient workman. "My Father worketh hitherto and I work," he said. His personal goodness is beyond dispute. "Which one of you convicteth me of sin" was His challenge to His enemies. His attitude to social goodness is expressed by others when they said, "He went about doing good" and by himself in the statement, "I came not to be served but to serve."

No other teacher ever laid such emphasis, as did Jesus, upon the necessity of right conduct in relation to one's fellows.

He makes it the very condition of judgment and destiny. "Inasmuch as ye did it unto one of the least of these, ye did it unto me." He set it up as a fundamental ideal in a golden rule of conduct—"Whatsoever ye would that men should do unto you, do ye likewise unto them" and joined it to the first great commandment—"Thou shalt love the Lord thy God—and thy neighbor as thyself." He made it clear to His still too selfish disciples that greatness consists not in power and dominion over others but in the service of others.

The purpose of these tests, therefore, is to help boys and men to see that in serving others through the ordinary vocations of life, through the home, community, or in the wider national and world life, they are building up the Kingdom of Jesus in the world. These

studies and activities will tend to stimulate in every man and boy these impulses and ideals, and strengthen his will for a life of real goodness and worth-while service.

I

Home Relationships

A SMALL boy is said to have given this definition of a big brother: "He is a feller wot knows all about yer, and likes yer just the same." It is pretty nearly certain that nobody else knows as much about you as the folks at home, and if father, mother, brothers and sisters were to tell frankly all that they know about you, it might surprise even you.

Yet they "like you just the same." To those of us who know ourselves fairly well, perhaps that is more surprising still. Certainly they have done more for us than everybody else put together, and no boy can begin to realize how much time and thought and devotion and sacrifice his parents gave to him during those first three or four years of his life of which his memory has so little record.

And now what about the "Home Relationships" of the TUXIS BOY? He is in a position now to show to his mother that fine, chivalrous consideration that every mother appreciates. He can now be the escort and protector of sisters or small brothers, and as he approaches manhood he can become more and more his father's companion and his dependable helper.

The TUXIS BOY is entering more fully into partnership with the other people in the home. He knows more about the family budget than when he was younger and he can help the family by strict economy in his own expenses or, if necessary, by actually con-

tributing to the support of the home. He will learn more of his father's work and will, if possible, help in it. This is comparatively easy if father is a farmer, builder or other outdoor worker, but much more difficult where father's work is done away from home. Even in this case, however, every real TUXIS BOY will find some way of sharing in the burdens and responsibility of the family and take over as his own some definite duties about the home.

The boy who doesn't make good as a son and as a brother does not deserve ever to have a home of his own, for he is certain to be unfit to be a husband or a father.

Home Relationships—Test

1. Personal Relations.

Through thoughtfulness expressed in kindly acts indicate appreciation of mother. Maintain confidential relationship and mutual understanding with father regarding vocational plans and social life. Contribute to the happiness of the home by interest in and thoughtfulness for other members of the family.

2. Home Usefulness.

(a) Put in at least twenty hours in construction of new articles or repairing old articles in use about the home.

(b) Fix outside storm windows; put on and remove. Repair and place screens on windows and doors.
Repair gates and fences.
Lay carpets and repair upholstery.
Fix curtain rods or blind fixtures.
Repair gas fittings and replace gas mantels.
Whitewash ceiling and walls.
Know how to solder lead joints and place new washers in taps.
Repair window sash cords, window and door fastenings.
Understand the drainage system of a house and explain the use of traps and vents.

Know the regulations of the local Health Department with regard to plumbing and sanitation of dwellings.

Test—Carry out (a)—and any three of the items stated under (b) or similar work.

3. Thrift.

Make and carry out plans for earning a definite sum of money during the year.

Have a bank account and plan to save regularly a certain percentage of earnings or allowance.

Keep a personal cash record and balance the account once a week.

Know the plan and value of the Canadian Government Annuities.

Get figures and compare three different plans of life insurance.

Contrast the rate of insurance if taken up now or at twenty-five years of age.

Participate in the promotion of and buy War Savings Stamps, War Savings Certificates and Victory Bonds.

4. Home Sharing.

(a) Partnership in home finances.

If employed, sharing in upkeep.

If at school, knowing what it costs to keep you there. Arrange a definite allowance and keep within it to make burden on parents as light as possible. If necessary earn part or all of money needed to stay in school.

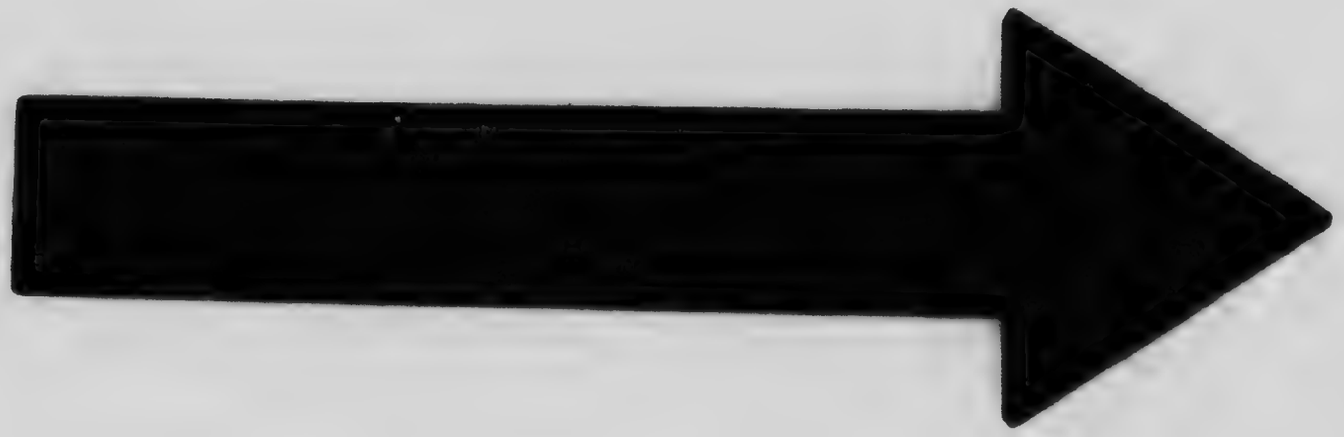
(b) Entertaining your own and family friends.

Plans for social life should bring some of your friends to your home at least once a week.

Remain at home to help entertain guests when you might prefer to be out with your own friends.

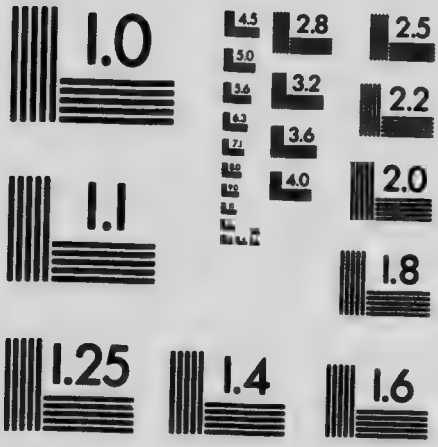
(c) Have definite responsibility for some special part of the home.

Caring for furnace, garden, chickens, pets, etc.



MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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If on the farm share in work and arrange to have plot of ground, pigs, calf, etc., given you to care for and dispose of as you see fit.

If possible share in business which supports the home, and arrange that your allowance should be in recognition of your services.

CHARTING HONORS

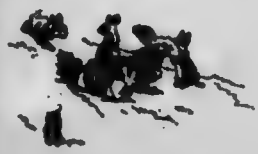
Charting Honors will be awarded by the Mentor according to the extent to which the above tests are carried out. 90% Red; 80% Blue; 70% White Honors.

II

Community Responsibility

TWENTY centuries ago the Apostle said, "no man liveth unto himself." That was true then, and it is ten times more so to-day in our complex civilization. Every member of the community has some responsibility to others in that community. Any boy who feels that it does not matter very much what he does or how he acts, that it is nobody's business but his own, is very much mistaken. Picture a community in which every one was a law unto himself. To what a state of chaos it would soon come!

Every TUXIS BOY should realize that he has certain relationships and responsibilities to those around him and to the community in which he lives. Community life is the sum total of the individual lives. Therefore the kind of life a boy lives will either raise or lower the level of the life in his community. If he can influence others to a higher standard of life he has contributed something to the community life as a whole. If he can bring some real fun and laughter, something of the play spirit into the lives of those he touches, he is of value to the community.



Canada needs increasingly the man with a spirit of public service who is interested in conditions around him—the man who can bring high ideals of personal and community life—the man who can add to the fun and joys of life and lessen its ills. TUXIS BOYS are these men in the making. The Program outlined below suggests worth-while ways in which you can help build up a better community life.

Community Responsibility—Test

A. Active participation in community welfare efforts such as:
Playground Movement.
Big Brother Movement.
Assist in Anti-Tuberculosis Campaign (by selling Christmas seals).
Contribute service in connection with clean-up campaigns, beautifying front or back yards, etc.

B. Know the history of your own locality and the institutions, public and private, which stand for community uplift.

C. Describe two public services done for the people of your own locality by either the Dominion or Provincial Government.

D. Attend one Session of the Dominion or Provincial Parliament or Municipal Council.

E. Indicate and describe five laws or Acts of Parliament affecting the welfare of boy life.

F. Practical talks should be attended, one each year, on subjects such as the following:
"Strangers within our Gates" with special reference to Canadian immigration problems and their solution.
"Some Foes of Canadian Democracy," with special reference to organized corporate selfishness, vested interests, public indifference, the patronage system, etc.
"The Principles and Functions of Canadian Government," etc.

G. The 3 C's Crusade—The popular movement for clean speech, clean sports and clean habits that is gripping the boy life of Canada. In many schools practically all the boys have signed "Statement of Purpose" cards indicating their desire to participate in this campaign. Any boy who uses profanity or vulgarity, is unfair in games, unchivalrous towards girls or women, uses tobacco in any form or who is generally slovenly in appearance or work is entirely disqualified to any grade in this test. Information regarding this movement and blank forms for its promotion may be secured from the C.S.E.T. Committee. Attend a talk on "The Movement for Clean Speech, Clean Sports, Clean Habits," and give evidence of participation in the movement and personal adherence to its ideals.

H. Take part in a survey of boy life of your community and assist in relating boys to Church and Sunday School.

I. Know something of the aims and plans of the Safety First Movement and assist in promoting them.

CHARTING HONORS

Charting Honors will be awarded by the Mentor or Local Board of Judges. 90% Red; 80% Blue; 70% White Honors. Definite knowledge of interest and participation in community life and activities will be required before any Honors are granted.

III

Choosing Life Work

WHEN a boy chooses a baseball glove, he carefully selects one that fits his hand, is adapted to the work he wants to do and will help him to play his best brand of ball. Many times boys choose their work in life without giving the choice the same kind of care. They take the first position that is open, which is a great mistake.

It is a mistake to choose one's vocation carelessly

because there are some lines of work that offer much better opportunities for the future than others. The "blind alley" job is one that a fellow could keep all his life and get little or no advancement. The position that gives a boy a chance to grow with the years is the one to choose.

It is a mistake to choose one's vocation carelessly because almost every person has some one line of work that he can do better than anything else. Every TUXIS BOY should sit down and carefully fill out a "Self-Analysis Blank." Discuss the matter with parents and sympathetic friends to discover the line of life work for which he is best fitted.

It is a mistake to choose one's vocation carelessly because every person's work has a deep, far-reaching influence upon his life. He spends usually more than one-third of all his time at his work. If he enjoys his work and finds in it an opportunity to use all his powers, his life is changed by that fact and he is happy, radiant, masterful and strong. If he goes to his work with a grouch and returns from it with a deep sigh of relief, his life becomes depressed, full of fears and worries, and he loses his optimism, courage and faith. To enjoy one's vocation and to be absorbed in it during working hours is one of life's deepest satisfactions.

Choosing Life Work—Test

A. Practical Talks.—Attend at least one each year on topics such as the following:

"The Elements of True Success in Life."

"Preparation for Life Work."

"Efficiency in Life Work," outlining value of honesty, courage, self-respect, economy, promptness and politeness.

"The Life of a Successful Canadian."

"The Special Characteristics Needed to Become Successful in Agriculture," or in any of the following

vocations: trades, business life, professions, social welfare work, etc.

B. Have an interview with three men representing vocations in which you are interested.

C. Test yourself with regard to your interests and abilities, shortcomings, etc., by answering the questions on the Self Analysis Blank which may be secured from the C.S.E.T Supply Depot.

CHARTING HONORS

Charting Honors whether Red, Blue or White will be determined by the Mentor upon the basis of the definite study of different fields of life work and progress made in determining the best line of work for which to prepare.

IV

Special Training

HUMAN beings are so closely bound together by the ties of need in this old world that our only excuse for staying in it is our willingness and ability to serve — to help the other fellow. Then, too, the thrill of real joy comes only to those who serve. It is a thrill that leaves no sting behind it, a thrill that nothing can efface.

You have been working out the four-fold program for boys, laying the foundations of a strong personality. Now you are reaching the place where your own special contribution to the social life of which you form a part is ready for expression. You, perhaps, are feeling that you would like to be prepared for the day when opportunity is going to knock hard at your door with a call to service. If you act on that feeling, TUXIS BOY, you have justified your existence.

A desire to save life is good. A First Aid Course may help some man or woman to hold fast to the

blessed gift of life. A desire to lead a group of younger fellows to richer experiences is good. A Teacher-Training Course may help some smaller chaps who are watching you to lives of strength and virility. A desire to train folks in recreation is good. A Story-Telling Course or Course in Recreational Leadership may help some other people to the mental attitude that brings real pleasure to life. The next thing is to clinch that desire by training.

You may not be an easy mixer; you may not be strong on entertaining; you may think there is no place for you in the social life of the group; yet if you train yourself for service, you are as social as the most jovial joker in the crowd.

As a boy, "Honest Abe" Lincoln said, "I will study and get ready and then, maybe, my chance will come." It came all right. And it would have come to him just the same if he hadn't been ready, but it would have stopped right there. Get some special training that will satisfy your desire to serve and when your chance comes you will be ready. Then you will never know the helpless and humiliating experience of standing, wringing your hands, while a fellow-man passes away for want of the knowledge you could gain, or see a group of young boys get a wrong start for want of the leadership you could have provided.

Special Training—Test

A. First Aid to the Injured.—Cover the work in this subject as found in chapter IX

B. Teacher Training.—Attend a course of at least eight weeks' duration on "Starting to Teach," by Eugene C. Foster.

"Adolescent Boyhood," by H. M. Burr.

"The Boy and the Church," by E. C. Foster, "The Boy Problem," by W. B. Forbush, or a course on any other book of equal standard.

C. Entertaining and Story-Telling. — Know something of its principles and entertain a group of not less than four persons on five or more occasions by either singing a song, playing some musical instrument, giving a reading or recitation, telling a story or taking part in a dialogue, or some form of a group entertainment of an educational nature.

D. Secure whatever training you can which will fit you to lead in social and physical activities among boys.

FIRST AID

CHARTING HONORS AND HONOR BADGES

	"A" On Exam.	"B" On Exam.	"C" and "D"
1st. Red.....	90%	90%	Determined by Mentor
2nd. Blue.....	80%	80%	or Local Board of
3rd. White....	70%	70%	Judges.

V

Makers of Canada

"Lives of great men all remind us
We can make our lives sublime,
And departing leave behind us
Footprints on the sands of time."

DO you know more of Longfellow than his name and this verse? Do we not often satisfy ourselves with merely knowing Milton, Knox and other great names and know nothing about their works and lives?

If this is so we are almost as little informed as a young lady who said gushingly, "I'm so pleased to meet you Col. Roosevelt. I think I have heard my father speak of you."

It is true as to the "Makers of Canada" that not to know their names "is to argue yourself unknown."

One who moves in a narrow, ignorant circle, who reads but little and who does not even know the names of the great men of his time, proves himself a nonentity.

If we would escape this humiliation and would be a factor as well as an actor in our generation we should acquaint ourselves not merely with the names but with the thoughts and ambitions that fired those who led thought and action in previous generations.

The Book is a biography, and the acts and words of the Master recorded therein have influenced thought and history more than the contents of any other book in the world. It is also true of other books that they have had a mighty, permanent influence for good whenever they record the achievements of makers of history. Most great stories of fiction have their day and are forgotten, but lives that inspired, lives that really wrought, lives that accomplished something worth while—these remain of permanent interest to mankind.

The Program gives you an opportunity to be proud of Canadian achievement and to drink in inspiration and enthusiasm for lofty ideals through the study of the lives of "Makers of Canada."

Makers of Canada—Test

Attend a talk or read up and give a speech on the life of any man entitled to be called a Maker of Canada. Including pioneers, statesmen, missionaries, business or professional men, writers, educators and military heroes.

CHARTING HONORS

Charting Honors will be awarded by Mentor to those who qualify fully in the above requirements and have a real interest in and knowledge of some of the outstanding Makers of Canada. 90% Red; 80% Blue; 70% White Honors.

VI

World Service

WHICH was the greater Frenchman—Napoleon who used his genius to destroy thousands, or Pasteur who has given his scientific ability to the saving of human life? Which was the greater American, J. P. Morgan who wrecked a railroad to add to his wealth or Abraham Lincoln whose one object in life was to save the nation, not himself?

There are two ways in which a man can look upon the world. He can say: "I am in the world for what I can get out of it, the world owes me a living"; or he can say: "I owe the world a life; I am in the world for what I can put into it." He may live with one ambition—to extract all he can from the world, or to leave it a better place than he found it. In looking at life in the first way a man becomes a mere self seeker who grasps for all he can get. When a man views his life in the second way he becomes a world server. The important fact for every TUXIS BOY to remember is that every man begins to choose which of these positions shall be his when he is still a lad. In a recent book there were published brief life-stories of one hundred men who served the world, in big, far-reaching ways and almost every one of them has said that he began to feel his ideal of world service when a boy.

World Service—Test

At least a four weeks' course in mission study along the lines of "The World a Field for Christian Service." The following books are recommended, additional books and full information regarding plans of study may be secured by writing your denominational Missionary Secretary.

Honor Badges for Tuxis Boys

SHOWN IN COLOR

ALL BADGES REPRODUCED HEREWITH, ARE ISSUED IN THREE DEGREES
WHITE HONOR - LOWEST CLASS · BLUE HONOR - MIDDLE CLASS · RED HONOR - HIGHEST CLASS

The TUXIS SWEATER CREST with HONOR BADGES

FOLK DANCING

THROWING

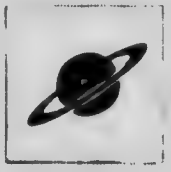
HOBBIES

HONOR BADGES

White Honor—Shown in Yellow and Black
Blue Honor—Shown in Blue
Red Honor—Shown in Red

ARCHITECTURE

TREES & SHRUBS


ASTRONOMY

AVIATION

HORTICULTURE

WILD FLOWERS & FERNS

BIRDS

CAMPING

ART

PHOTOGRAPHY

CANOEING

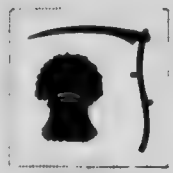
AQUATICS

RUNNING

JUMPING

SAILING

TEAM GAMES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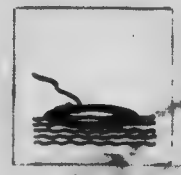
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ENTERTAINER

SKIING

SNOWSHOEING

ROWING

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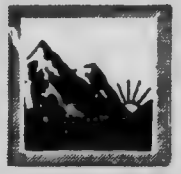
MOUNTAIN CLIMBING

SKATING

MOTOR MECHANICS

CENTURY HIKER

FIRST AID

INDIAN LIFE

CITIZENSHIP

PUBLIC SPEAKING

HEALTH & ENDURANCE

"L[illegible]ingstone the Pathfinder," Matthews.
"The Great Heart of Papua," Matthews.
"The Servants of the King," Speer.
"Winners of the World," Gardiner.
"New Life in China," Wallace.
"Making Life Count," Eugene C. Foster.

CHARTING HONORS

Charting Honors will be awarded for full attendance during this course of study and for written or oral test: 90% Red; 80% Blue; 70% White Honors.

THE SPIRIT OF TUXIS

THE SPIRIT OF TUXIS

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CHAPTER VI

A HERITAGE OF EXCELLENCE

Sacrifice and Service

IN many ways the war has been a wonderful teacher. It has revealed the blackness, the frightfulness, into which perverted minds may descend. It has shown the heights to which loyalty to ideals of righteousness may rise. It has been the occasion of almost unbelievable selfishness on the one hand, but, on the other, it has been a time of the most splendid sacrifice and service which, perhaps, have been surpassed only in the tragedy of Golgotha.

Sacrifice and service have ceased to be abstract terms but have become very intimate and meaningful ones to Canadians. The Great War teaches no greater lessons than these.

Canadians who have sacrificed and served are legion in number. They are from every province and from all classes of society, old and young, men and women; yes, and boys and girls. Service has been of many types and sacrifice in varying degree. Thousands upon thousands have paid the supreme sacrifice, among them many older boys who were interested in the development of ideals of Christian citizenship among the boys of Canada; boys who knew and followed the four-fold life of Him who said, "I am the way;" boys who followed it to the very end in the spirit of sacrifice, "For greater love hath no man than this, that a man lay down his life

for his friends." They were our friends and gratefully we pay our tribute in this volume which has for its purpose the inspiring of TUXIS BOYS with the same high ideals which were theirs.

Space will permit of only a brief reference being made to a few of these boys who are representative of a type of life which thousands of Canadian older boys have developed through contact with Jesus and have learned to the full the meaning of His words, I am among you as he that serveth."

Corporal George Gordon Galloway

Gordon Galloway

Gordon lived from June 9th, 1894, to February 9th, 1916, but few lives have been so rich and full. He was one of Toronto's four-square boys—the holder of the Prince of Wales Scholarship, a leader in outdoor sport, an active member of Bloor St. Presbyterian Church—and he had long decided to follow the uplifting of boys as his life work.

Gordon to become fit had to undergo an operation, and though advised to go after a commission, he preferred to go with his chums. A certain corporal was chosen to go into the trenches as an observer, but, at the last minute, Gordon took his place and was killed by a sniper.

Some of those who knew him, wrote as follows:

"While Gordons' life was brief, it was crowded full of nobility."

"I can in fancy see him smile. It was so contagious."

"In hi[illegible]rt life, he was privileged to do more genuine g[illegible] to his fellows than millions who lived the allotted three score and ten."

"He was a boy in a million and was wonderful to the end."

"His life meant a great deal to his fellows and was by no means lived in vain."

Gunner Gordon Cowan McIntosh

Gordon was a thoroughly typical four-fold boy. He was the finest type of young manhood, a leader in athletics, being a brilliant hockey player. He was one of the brightest graduates of the London Collegiate Institute, and had passed his entrance to the Faculty of Education. He was training himself to be a specialist in languages and would have had a distinguished career.

Gordon McIntosh

But the call came to him, as it came to thousands of others of Canada's best, and he enlisted with the 63rd Battery when he was nineteen. He left his home and friends. He placed aside his interests and ambitions, and entered the army with a high resolve to do his share for the democracy he had been taught to love. He gave his all, for he died from wounds in July, 1917. But, like many others of his type, "while dead he yet liveth."

His father, in writing of him said:

"He went out and gave his life for his country. According to the witness of his fellows in letters received, he followed the 'Jesus Way' to the end, wholly unspoiled by the army. He never retired at night in camp or on the battle-line without kneeling down before his chums and saying his prayers, which was probably a severer test of character than facing the German shrapnel."

Lieutenant Charles Hewson

Charlie, "Chuck" as he was known, was born in Toronto in 1897, attending public school and collegiate there. While scarcely out of his teens, he had developed leadership qualities in a very marked degree. He selected the Boys' Work Secretaryship as his life's work, and in the fall of 1915 entered Springfield College, remaining until the Christmas holidays, when he enlisted for overseas. He was

"Chick" Hewson

killed on April 9th at Vimy Ridge, just sixteen days after he landed in France.

The following is an extract from the last letter written by Charles to his mother:

"During the months in England and the weeks in France, where the biggest job is not dodging shells and commanding men, but keeping straight andtrue to the worth-while things, I have come out so far absolutely the same as I left—for your sake and the sake of those youngsters from Couchiching and the "Y" who never let me forget the things I stood for, and will continue to stand for."

Sergeant Horace Yeomans

Horace, better known as "Pat" Yeomans, was perhaps the best known, most highly respected and deeply loved boy in Belleville. He was a symmetrically developed boy Physically: prominent in athletics, notably football. Intellectually: a leader in High School, especially in literary work. Religiously: a member of his church and living it out. In Service: the teacher of a boys' Sunday School class, and an energetic worker in the Young Men's Christian Association. He charted high under all four Programs.

"Pat" Yeomans

Pat enlisted in August, 1914, a few days after he was eighteen years old He was with the first contingent at the front in February, 1915. He was valiant as he was conscientious, and was awarded the Distinguished Conduct Medal for rescuing a comrade under fire.

Pat was as clean as he was valiant. In a letter home, he spoke of the awful temptations, but says, "I have always considered that the ability to resist temptation is all that distinguishes a 'man' from a 'beast'."

Nor did Pat lower his standard. His Major writes: "Never for one moment did he depart from

the extremely high standard he had set himself of what a good, clean-living Canadian boy should be."

Private Horace Pearson

Horace was born in Barwell, Leicestershire, England, and was in his twenty-first year. He had resided in Toronto for some years. He was a graduate of Riverdale Collegiate Institute and was in his final year at the School of Practical Science in Civil Engineering when he enlisted and went overseas in the Cyclist Corps, being afterwards drafted to the 45th Battalion.

Horace Pearson

He was a four-square boy in very truth. He had unusual mental ability, and was an all-round athlete and expert rugby player. His whole life was permeated with a deep religious fervor. For some time before his enlistment he had been leading a group of boys in Woodgreen Methodist Sunday School where he was highly esteemed.

Before he left home for the front his father was talking to him and asking about his outlook on life. He took up a photo frame which held his photo and wrote the words: "And Jesus increased in wisdom and stature and in favor with God and man—The four-square life—My Motto." This was followed by the verse from the 19th Psalm: "Let the words of my mouth and the meditation of my heart be acceptable in Thy sight, O Lord! my strength and my Redeemer."

Lieut. Charles Melville Sayer

Charles Melville Sayer was born in London, Ont., in 1894. He later lived in Toronto, and when his father became Western Secretary of the Y.M.C.A. he went to Winnipeg. He matriculated from Central Collegiate and obtained his B.A. Degree from the University of Manitoba in 1915.

In August, 1916, he paid his own expenses to England and secured a commission in the Royal Flying Corps. In May, 1917, he crossed over to France and on Sunday, June 17th, he made the supreme sacrifice.

"Mel." Sayer

Like many another brave Canadian lad, Mel. Sayer was not of the fighting kind, but when the great call came to serve humanity, he responded gladly and eagerly. Even as a boy, he had the strength of deep conviction, with a remarkable discernment between right and wrong.

In all his thoughts and plans, service to others loomed large. In a letter he wrote: "To-day forty of our machines failed to return, but they had the satisfaction of knowing that they had saved the lives of thousands of men. If some day I fail to return, you will know that I was glad to give my life that others may live."

Lieut. Everett Fallis

Everett enlisted at Calgary in August, 1915. He was killed in action at Vimy Ridge, April 9th, 1917.

He was interested in Boys' Work, and attended some of the Boys' Work Conferences held in Calgary. He was preparing for further service. He had been a student at Mount Royal College, had matriculated from there, and was in the midst of his normal training when he enlisted.

Everett Fallis

A Y.M.C.A. Secretary in France, writing about Everett, said: "That, while laying down his life, he had been recommended for the V.C., his stainless Christian character, his bravery in the great attack at Vimy Ridge when every other officer in the battalion was a casualty early in the morning and he was practically in command of his battalion, is a story that will live in history and fills us with supreme admiration for his wonderful courage in action."

A simple cross marks his grave, but his splendid

life of service will stimulate boys in Canada to live as he did—the four-square life like unto that of the great Leader of men and boys, who gave Himself in sacrifice for a cause.

Corporal "Laddie" Millen

In Shorncliffe, England, stands a Y.M.C.A. building known as the "Laddie" Millen Hut, erected by some business men of Montreal as a memory to Corporal Lysle Millen, who was killed by a sniper in France, February 19th, 1916.

He was just nineteen when war broke out and was city traveler in Montreal for John Millen & Son, Ltd. He enlisted with the First University Company, P.P.C.L.I. After a month's training, he received permission to change to the Flying Corps, but his captain pleaded with him to remain, which he did. He went overseas in May, 1915, and was recommended for a commission, which he would have received had he lived ten days longer.

Lysle or "Laddie" as he was everywhere known, was outstanding in his life and in the service he rendered as member of his Sunday School and Y.M.C.A. That he carried this spirit with him into the trenches is evidenced by the expressions of his fellow soldiers and officers after his death.

One wrote: "I loved Laddie, loved him as a brother. He was my ideal for a young man. After six months in France, away from those influences which make it less hard to play the game, he was the same clean, pure, open and lovable character that he always was."

Another describes a little gathering overseas:

"After supper, Lysle drew a little hymn book out of his pocket and said, 'Let us sing some of the fine old hymns.' For an hour everyone sang heartily and reverently."

"Lysle wouldn't smoke, he wouldn't swear. He would not countenance anything that was not pure and noble and his example has been far-reaching."

"We all loved that boy. A large part of his influence was without doubt due to his well-known straight, clean, Christian-principled life."

The memory of "Laddie" will live long among his friends who knew him around Montreal as a boy and also in the minds of his soldier friends with whom he lived at the front.

Lieut. Struan Carmichael Robertson

Lieut. Struan Carmichael Robertson, R.F.A., was born at Westville, Nova Scotia, November 17th, 1897, and was the only son of Lieut.-Col. Struan Robertson, of Sea Bank, Pictou Co.

He received his education in the schools of Pictou and in 1916 graduated from the far-famed Pictou Academy. He at once responded to the call of the blood and took a lieutenant's course at the Military College, Kingston, receiving his commission in August, 1917, and shortly afterwards went overseas.

In December he volunteered on a call for officers for the front and sailed on January 1st, 1918, for France. Soon after his arrival in France, he again volunteered to assist the infantry in carrying out a very difficult task. While in performance of this duty, he was killed in action, March 21st, 1918.

The testimony of his brother officers, among whom he was very popular, was that he was a clean man and showed great bravery and coolness during a difficult time.

"Struie" was a C.S.E.T. boy through and through. He attended the first Provincial Conference held in Halifax in 1915 and from that time until his death was deeply interested in work among boys.

At the Nova Scotia Summer Camp, in 1916, he took another Forward Step, deciding to give his life for Christian service and there is no doubt in the minds of those who knew him best, that his life and character were making progress day by day and that he was developing in the Jesus Way.

Many boys in Nova Scotia say that they received their chief inspiration for the Christian life by coming in touch with "Struie" at the Big Cove Camp.

C.S.E.T. Groups in Action

THERE are in Canada to-day hundreds of boys' classes who have been using the Canadian Standard Efficiency Training. They are located in the largest cities and at the country cross-ro[illegible] Whenever this course of training has been fa[illegible] fully followed and has had intelligent, sympathetic leadership, results which have been marked both in individual and community life have been obtained. The few accounts of groups which follow are given as being characteristic of scores of others which are carrying out Boys' Work under similar conditions.

In a Small City

B—is a community of ten thousand which has had five years' experience with C.S.E.T. It started with one organized class but now every protestant church in the community has at least one C.S.E.T. group, some more. The first year, C.S.E.T. actually touched fourteen boys. This year about one hundred and twenty-five were reached. During the last five years, every Sunday School has each

year received trained leaders from the C.S.E.T. Classes for boys' groups. Nine boys developed into nine young men leading nine boys' clubs.

C.S.E.T. boys in this community have accomplished many things. A central organization was formed to correlate the various groups. This is known as the Older Boys' Council, meeting once a month. They have carried out one Provincial and three Local Boys' Work Conferences. Each year sees baseball and hockey leagues formed, outdoor and indoor athletic meets held, while each summer fifty of the boys camp out for two weeks. Four boys of a C.S E.T. group won the Spring Regatta for four-oared shells. Sixty-five answered the S.O.S. call for farm service.

One of the leaders says: "Ninety per cent. of all the older boys we ever came in contact with are overseas. Perhaps the greatest tribute to the C.S.E.T. comes back to us through their letters. One boy says, 'I never thought that those week-nights spent with the group were going to count so big in my life. Whether I come back or not, you can rely on me to play the man, and because of the good old E— bunch.'

"Another writes, 'I saw C. S.— and N.— the other day. Say, but they are in great shape. We had an old-time get-together pow-wow. We were of the same mind, that above all things our C.S.E.T. experience had helped us stay clean. Say W—, that bunch looked clean clear through. We had a little prayer all around before separating and you bet my big prayer is that you'll still keep getting across to the fellows back home.'

"Another boy says, "I want to tell you on the level D—, the C.S.E.T. fellows are shoulder high above the crowd over here. Many's the fellow who is getting by because of his C.S.E.T. gang in days gone by'."

In a Saskatchewan Hamlet

The Methodist Sunday School at H—, a hamlet fifty miles south-east of Moose Jaw, was an average rural school doing the work of religious education pretty much as it has been done for many years in most schools. A class of teen-age boys was operating with a young lady as teacher.

The pastor succeeded in having some of the boys go to the Older Boys' Conference at Regina. They came home bubbling with enthusiasm. It was decided to adopt the C.S.E.T. and Mr. P—, who had been the teacher of a young men's class which had disbanded because the members had enlisted, became the Mentor. Mr. P— accepted with reluctance. Concerning his taking up the work, he said: "I felt I could not do justice to the class or program and so told the boys to find someone else, but after a couple of weeks searching on the boys' part and some heart-searching on my own, they called again. This time, asking God to help me, I accepted the responsibility and got in touch with the C.S.E.T. which I began to use as the basis of our work."

The meetings were held on Saturday evening. This seems to be a more acceptable hour than any other and is responsible to some extent for some small changes in the order of the meetings. As the same class at Sunday School the day following meets at 12 o'clock, the devotional part, except opening with prayer and Bible-reading, is omitted A further change necessitated by lack of facilities was the dropping of the Physical Program work until the summer. On this account, the winter program is crowded with practical work. The boys soon developed a real interest in the work. As against the C.S.E.T. evening, the pool room lost its lure. Mr. P— took up "Men Who Dared" at first and while this held the smaller boys, in time the older ones grew restless. He later took up the "Life of Jesus" and while the

younger ones did not grasp it all, they were interested and it held the bigger fellows. It was while taking up the study of the "Life of Jesus" that personal, heart-to-heart talks took place between the Mentor and the boys.

Several of the boys with their Mentor attend each year the C.S.E.T. Summer Training Camp at Lumsden Beach.

The class has grown. It has been necessary to have two classes. The younger boys have been organized by themselves under the leadership of a capable young man.

"The Class Worth While" as it is known has done splendid work. The pastor referring to it said, "The most memorable day in the whole program of service was that day when several of the boys stood up in the presence of a crowded church and were received into full membership in the church. They brought a life of service to the Master and willingly undertook the obligations of the church."

This, after all, is the objective of a Mentor's work with boys. Mr. P—, working under conditions which might deter a less consecrated man, has the satisfaction of seeing the boys in his class growing into useful, Christian citizens.

In an Ontario Village

Three years ago a young man went to practice dentistry in the small village of A—. He was interested in boys but hardly knew how best to help them. He realized, however, that the best work could only be done by adding to the activities of the Sunday School Class. So a class was organized with a mid-week meeting without, however, having any definite program.

Speaking of his experiences, he said: "In the fall of 1916, I learned through the newspapers a little about C.S.E.T. We sent three boys to the big

Conference which was one of those held in connection with the "Coast to Coast" series, and they came home with glowing reports and plenty of enthusiasm. During that winter, we used the plan partially, following the more complete Program next year. During last year, we conducted our meetings in the form of a parliament. Initiations were used for new members."

The group which is a community one has twenty members. Five of them hold offices in the Sunday School and church, while six joined the church during the last year. Among the good results which have been accomplished, the following have been observed: The boys have been more closely linked up to church and Sunday School. The boys of the community use cleaner speech. Sex education among them has had a beneficial effect.

In a Metropolitan City

"When our class reorganized in the Fall of 1917, we found ourselves without a Mentor and no amount of search could produce the man whom we considered suitable for the position. Rather than drop the C.S.E.T. however, we decided to put through the Program without a Mentor. Our officers were elected and committees formed to do the various parts of the arrangement work according to the C.S.E.T. handbook. A program for the winter was drawn up and speakers obtained for each subject under the course. Here again we were surprised at the willingness of both business and professional men to give us some of their valuable time. The gym. floor of a neighboring Y.M.C.A. was obtained for one afternoon a week and our Physical program outlined. It meant hard work for us, but we saw the results of our efforts when some of us were asked by other groups to visit them and help them with the carrying out of their program.

"The success of the winter's work was shown not only in the better spirit which existed among the fellows and their ability to express their thoughts upon the public platform, but there was the impressive fact that during the winter and spring, ten members of the group took their stand for Jesus Christ and became full members of the church. Two are now teachers in the Sunday School. In our case, we believe that the group actually derived more good from the C.S.E.T. course by working it out themselves than they would have received under the leadership of a Mentor."

In a Maritime Town

"Our class was organized as a result of the Conference held at Truro in 1917. From thirty-five to forty members were enrolled, and there has been an average attendance of 25. Four churches were represented, the Presbyterian, Methodist, Baptist and Anglican. The Pastors of the first three churches acted as Mentors for their respective groups, and the class held the meetings in those churches in turn for periods of six weeks.

"A good program was arranged including talks on citizenship, education, hygiene, sound thinking, the art of argument, weather forecasting, etc. by prominent men of the district. The booklet "Men who Dared" served as a text book for the devotional periods. Occasional divergences were made on the lines of general Bible Study.

"Whenever the premises were suitable, the tests were carried out. The regular program has been discontinued for mid-summer, but the athletic part is being continued, and it is intended to make an early start in the autumn for an even more successful course."

CHAPTER VII

THE MEANING OF THE FOUR-FOLD EMBLEM

AS the Program which Tuxis Boys are following is a four-fold one and the character which you are trying to build is four-fold in its ideal of perfection so must an emblem which symbolizes the spirit of Tuxis Boys also be four-fold. That is the dominant feature of the Tuxis Emblem, which you see on the top of this page. Each of the figures which are shown within the four divisions of the circle are central figures in famous pictures or events and are indicative of the four sides of a Tuxis Boy's development.

Around the circle over each of the divisions are the following Latin words: Sapientia, intended to denote the intellectual side of life; statura, the physical side; sanctitas, the devotional side; sodalitas, the social side.

Each of the four divisions in the circle are made because of the letter "X" which runs through its centre. "X," as you no doubt know, is the letter in the English alphabet which stands for the Greek "Chi," and was the first letter in the Greek word for "Christ." The "X," therefore, as it symbolizes Christ, assumes important relation to the divisions in the centre of the circle. As it binds each part of the circle to the other in symmetry, so a TUXIS BOY's ideal of Christ relates each action in every department of his life to the other that he may grow symmetrically in body and mind, in the spiritual and social life, and may focus them all on his ideal of Christ—his Standard. As the circle is "X"-centered, so is the Program around which a TUXIS BOY expresses his life Christ-centered.

St. Cuthbert, the boy Penrose has pictured in his masterpiece, as shown under Sapientia, the Intellectual; Phillipides, who ran over the first Marathon course, and used his strength in service, as pictured under Statura, the Physical; the Knight who is pictured by Pettie in the attitude of prayer before he assumes the obligation of his knighthood, as shown under Sanctitas, the Devotional; Sir Galahad, whose life was actuated by the spirit of service, as pictured by Watts under Sodalitas, the Social; all are but the central figures in masterpieces of art or achievement which symbolize in a graphic way the simple statement by Luke that "Jesus increased in wisdom and stature and in favor with God and man"—the four-fold life of development into splendid possibilities and infinite power. The stories surrounding the pictures which go to make up the emblem should be known to every TUXIS BOY, as should the pictures themselves. A brief account of each follows with a reproduction and it is hoped that every TUXIS BOY will add them to his store of knowledge.

The First Story

THE Venerable Bede was the intellectual giant of his time, the first great English scholar. He was born in the seventh century, one hundred years after Augustine founded the cathedral at Canterbury, and two centuries before King Alfred reigned. He spent his life from childhood in a monastery, the ruins of which may still be seen at Jarrow, seven miles from Newcastle, in England. He refused all worldly promotion, so heartily did he devote his time and energy to producing books on history, medicine, music, astronomy, arithmetic, poetry and many other subjects. These were in use, not only during his life in his own school of over 600 students (an immense number for those days), but for four centuries afterwards. He was a friend of Caedmon, the first English poet, and, although a Greek and Latin scholar, dearly loved the English tongue. He was the first to translate the Bible into Anglo-Saxon, and passed away just as he completed the Gospel of St. John. One of his pupils, St. Cuthbert, wrote a letter describing the death of the great man surrounded by his scholars. Although a fatal and painful sickness was upon him, he stoutly, with cheerfulness and even with songs of praise, persisted in his plan to complete a faithful translation into the mother tongue, so that all might read the fourth Gospel, the Gospel of Love.

"I don't want my boys to read a lie," he answered to those who would have had him rest, "nor to work to no purpose after I am gone."

A few days before Ascension-tide his sickness grew upon him, but he spent the whole day in teaching, only saying cheerfully to his scholars, "Learn with what speed ye may; I know not how long I may last." Another dawn broke upon a

sleepless night and again the old man called his scholars around him and bade them write.

"There is still a chapter wanting," said St. Cuthbert, "and it is hard for thee to question thyself any longer."

"It is easily done," said Bede; "Take thy pen and write quickly."

Amid tears and farewells, the day wore on to eventide.

"There is yet one sentence unwritten, dear master," said the boy Cuthbert.

"Write it quickly," bade the dying man.

"It is finished now," said the little scribe at last.

"You speak truth," said the master; "all is finished now."

Placed upon the pavement his head supported in his scholars' arms, his face turned to the spot where he was wont to pray, Bede chanted the solemn "Gloria in Excelsis"—Glory to God in the Highest. As his voice reached the close of his song he passed quietly away.

TUXIS BOYS have as part of their emblem a reminder of this great man whose intellect was dedicated to the service of God and of his fellowmen.

The Second Story

THE physical side of life is represented in our emblem by an outline of the Greek runner, Phillipides, who brought the news of the battle of Marathon, 490 B.C., to Athens. One account says he ran the twenty-two miles in full armor. The runner sank exhausted at the feet of the Archons, or chief magistrates, who, seated in suspense, awaited news. "Rejoice, we win," he gasped, and passed away.

From a reproduction of the original painting by J. Doyle Penrose, owned by the Autotype Co., London

ST. CUTHBERT

It was indeed the greatest news of centuries. Little Athens under Miltiades, with her handful of men (9000) and allies (the whole Plataean male population, 1000 men among them), defeated the mighty Persian army of the tyrant King Darius who had determined on extinguishing or conquering all small nations. He had, like monsters of later days, slain the men, enslaved the women and children, and burned and destroyed the temples. He believed that "all human beings are the natural slaves of the Persian King"—the tyrant's creed which has survived to this day from century to century. The little democracy stemmed the tide of Persian brute force, and saved the world for freedom at Marathon in a locality that had been sacred to Hercules, the god of strength.

The Athenians fought not for themselves alone, but for all peoples of all time, and the dedication of their physical prowess to the service of others is a lesson for all the centuries.

The Third Story

THIS great picture, "The Vigil," by John Pettie (1839-1893), hangs in the Tate Gallery, London.

The candidate for knighthood, bathed and signed with the cross, was instructed as to the order and feats of chivalry. Then, dressed in a pure white shirt with over-robe of russet, he knelt at nightfall at the altar, his helmet, armor and accoutrements laid before it. With the cross of his sword held before his earnest eyes he watched and prayed until sunrise, keeping vigil and seeking strength for his crusade against the powers of evil. Though modern Christian knights are not called upon to sustain such physical strain and stress, the eternal command is for all time;

PHILLIPIDES

Bringing News of Victory at the Battle of Marathon

"Christian, seek not yet repose,
Hear thy guardian angel say:
Thou art in the midst of foes;
Watch and pray.

Gird thy heavenly armor on,
Wear it ever night and day.
Ambushed lies the evil one;
Watch and pray."

"Thy guardian angel" may refer to a sainted mother who has gone before, or to some loving earthly companion, or to the Comforter "Who came sweet influence to impart." "Watch and Pray" is our Lord's command, and in our night and morning watch;

"Watch, as if on that alone,
Hung the issue of the day;
Pray that help may be sent down;
Watch and pray."

The Fourth Story

THE famous painting by George Frederick Watts hangs in the Tate Gallery, London. It is a picture of the young knight of chivalry, Sir Galahad, of Arthur's Round Table, the legendary band of knights that figured so prominently in medieval romance. It would fill a volume to tell the whole story of Sir Galahad, a young hero, whose strength was as the strength of ten, because his heart was pure.

Tennyson in "The Holy Grail,"* puts these words into the mouth of Sir Percival:

"And one there was among us, ever moved,
Among us in white armor, Galahad.
'God make thee good, as thou are beautiful,'
Said Arthur, when he dubb'd him knight; and none,
In so young youth, was ever made a knight
Till Galahad."

*Idylls of the King.

Tate Gallery. *From the Painting by John Pettie, R.A.*

THE VIGIL

Upon his entry into that company of chivalrous knights, King Arthur took from him that vow which may well thrill men till the end of time.

"I made them lay their hands in mine, and swear
To reverence the King, as if he were
Their conscience, and their conscience as their King;
To break the heathen, and uphold the Christ,
To ride abroad redressing human wrongs,
To speak no slander, no, nor listen to it,
To honor his own word, as if his God's,
To lead sweet lives in purest chastity,
To love one maiden only, cleave to her,
And worship her by years of noble deeds,
Until they win her; for indeed I know
Of not more subtle master under heaven,
Than is the maiden passion for a maid,
Not only to keep down the base in man,
But teach high thoughts and amiable words,
And courtliness, and the desire of fame,
And love of truth, and all that makes a man."*

The keynote of Sir Galahad's life of service was "If I lose myself I save myself." His courtesy was that of the true knight, ever alert to defend the weak and espouse the cause of womanhood.

Sir Galahad rang true, and upon the Quest for the Holy Grail forgot not his solemn vow in any of the thrilling adventures and trials he passed through before he saw again;

"The cup, the cup itself, from which our Lord
Drank at the last sad supper with His own."

Through all the Quest, Percival followed, but one by one for him the visions faded and the glorious things he thought to touch fell into dust, so that he cried in agony;

"Lo, if I find the Holy Grail itself
And I touch it, it will crumble into dust."

*Tennyson's Guinevere (Idylls of the King).

From the Painting by G. F. Watts, R.A.

SIR GALAHAD

To him came the rebuke that Sir Galahad needed not, but which all of us must heed;

"O Son, thou hast not true humility,
The highest virtue, mother of them all,
Thou has not lost thyself to save thyself
As Galahad."

And to him came Galahad, in silver armor, exalted with the Vision of his Lord in the Holy Grail, and said,

"In the strength of this I rode,
Shattering all evil customs everywhere
.....and in the strength of this
Come victor."

Percival inspired by such youthful and lofty enthusiasm and looking into eyes that had beheld a higher vision, exclaimed,

"While thus he spake, his eye, dwelling on mine,
Drew me, with power upon me, till I grew
One with him, to believe as he believed."

Such is the power of comradeship, so must we all seek to draw others to believe as we believe, that only by a life of service and sacrifice, only by losing ourselves to save ourselves, can we attain real Christian knighthood. Sir Galahad got his sword and shield, found the Holy Grail, and after he was crowned King in the Sacred City, his soul passed to his Lord and Master when, as he kneeled in prayer, the covering was removed and he stood "face to face" in the Presence.

Let this "legend beautiful" serve to stir us to practical deeds of service.

SNAPSHOTS IN THE FIELD OF KNOWLEDGE

SNAPSHOTS IN THE FIELD OF KNOWLEDGE

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CHAPTER VIII

WORTH-WHILE ATTAINMENTS

Health and Endurance

Geo. J. Fisher, M.D.

Secretary, Physical Department, International Committee Young Men's Christian Association.

(Prepared for the Handbook of the Boy Scouts of America and reprinted with permission of the Editorial Board.)

HERE is a fact which many boys overlook when they plan their life work and make preparations for it: "All the human beings we know anything about have the happy habit of being in bodies." The quoted statement means that all earthly activity is founded upon and conditioned by a physical basis. In other words, a boy can only go as far as his body will take him. He may dream of future greatness when he shall do great work in some of the world's highest callings; the dream must be made real, and he can make it real only so far as his body will take him.

Physical efficiency then should be an important goal before every Tuxis Boy of to-day. Unless a boy has been handicapped by some accident or some unfortunate heredity it is possible for him to be positively, radiantly, joyously well and he should refuse to allow himself to be anything less. He owes not only to himself but also to those about him a healthy, vigorous life. If he becomes a whining, grumbling, irritable man he has defrauded

himself and his friends. He should see to it that he does not burden his family with any unnecessary doctor's bill, misery and anxiety, and that he does not break down and die at an early age—his and their hopes unrealized.

Physical efficiency is not an accident; it does not come as a piece of good luck; it cannot be bought at the drug store at a dollar a bottle any more than women can buy good complexions there at fifty cents a box. Good health comes according to a law of definite returns; it comes according to method and not magic.

The following provides simple and complete rules for the attaining of physical efficiency:

Growth and Fitness

The chief business of a boy is to grow. He may have other affairs, but this is his chief concern. He should, therefore, have a few simple rules for living and make them a part of his daily life.

Two things greatly affect the conditions under which a boy lives in these days. One is that he lives indoors for the greater part of the time, and the other is that he must attend school, which is pretty largely a matter of sitting still. Two things, therefore, are needs of every boy; outdoor experience and physical activity.

To secure endurance, physical power, physical courage, and skill, the first thing needful is to take stock of one's physical make-up, put the body in the best possible condition for doing its work and then keep it in good order.

Proper Carriage

"Walk with head up and chest raised"—is a good slogan for a boy who desires an erect figure.

There is no particular exercise that a boy can take to cure round shoulders. The thing to remember is

that all exercise that is taken should be done in the erect position, then the muscles will hold the body there.

An erect body means a deeper chest, room for the important organs to work, and thus affords them the best chance to act.

A few setting-up exercises each day in the erect position before breakfast will greatly help to get this result.

Outdoor Exercise

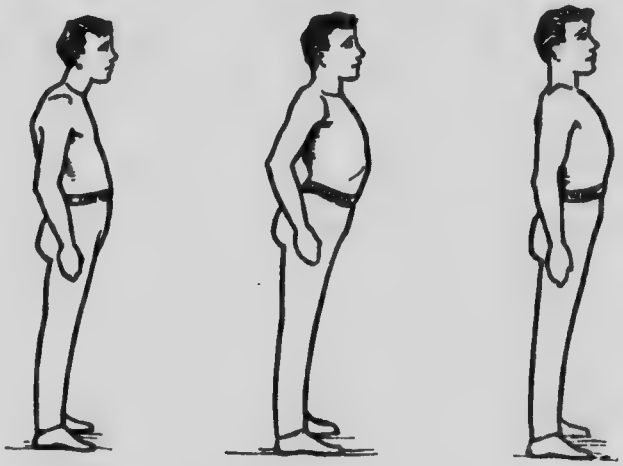
Each day should have its outdoor exercises. Walking is a splendid form of exercise. Walk to school or business; don't ride unless absolutely necessary because of unusual distance. Walk with good swinging stride with chest well up and spine fairly straight. Slow running across country is great; it lacks strain and yet affords splendid stimulation to heart and lungs. Cross-country running and hiking should be a favorite sport for growing boys. A boy ought to have at least two hours of sport daily in some good vigorous game, such as baseball or tennis, and, if he can possibly afford it, at least two periods a week, of an hour each in a gymnasium, where he can receive guidance in body building.

Boys under sixteen should avoid exercise involving strain, such as weight lifting, or sprint running over one hundred yards, or long-distance racing. Work on gymnastic apparatus may prove harmful unless of the right sort. The horse and parallel bars should be used largely to jump over rather than perform upon. Exercises demanding a sustaining support of the body with the arms are not helpful, but may be harmful. The chief activity should be of the legs, to strengthen heart and lungs.

A boy should be careful not to *overdo*. In his excitement to win in a contest he is likely to do

this unless cautioned. A boy should never try to reduce his weight. Now that there are weight classes in sports for boys there is a temptation to do this and it may prove very serious. Severe training for athletics should be avoided. Boys at this age should not play vigorous indoor games like basket-ball for longer than two ten-minute halves, and should not play at all where the air is foul. All training should be in moderation.

SETTING-UP EXERCISES



Incorrect *Incorrect* *Correct*

STANDING AT ATTENTION

This correct position should be taken before commencing exercises.

Physical Examinations

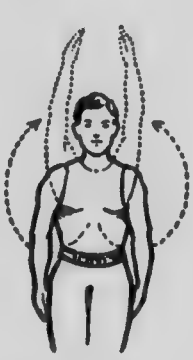
Every boy ought to have a thorough physical examination. Some physician who is interested in boys will be willing to act as examiner. A boy should know the condition of his heart and lungs before entering any contest. If he has any defects in his breathing apparatus—nose, throat, or lungs, these should be attended to or they will seriously interfere with his powers of endurance.

Baths

Besides exercises a boy should have simple, workable rules for living. A boy ought to take a good soap bath at least twice a week and always after he has played a hard game or performed work of a nature that has caused him to perspire freely.

Each morning a quick sponge bath, immediately after the setting-up exercises, should be the first order of the day, in water as cool as he can stand

SETTING-UP EXERCISES



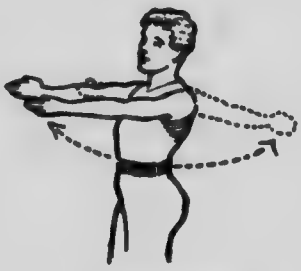
EXERCISE 1

Position: Heels together, arms down and at sides, palms in.

Movement: Swing arms side-ways, upward to vertical, and return

EXERCISE 2

Same as Exercise 1, except that arms are swung forward, upward vertical.



EXERCISE 3

Position: Arms front horizontal. Movement: same style as rest, swing to side horizontal and return.

it, followed by a good rub with a coarse towel. If there is a feeling of warmth after the bath, it is helpful, if not, the water should be slightly warmer, or only a portion of the body should be bathed at a time.

Pain

One thing that should be regarded seriously is pain in any form in any part of the body. If there is a dull headache frequently, find out what causes it. Pain in the knee, the arch of the foot, or at

any point, should be taken seriously. Pain means something wrong. It may be brave to bear it, but it is not wise. It may mean something serious. Remember that pain felt in one part of the body may be the result of something wrong in another part. See a wise doctor about it.

Eating

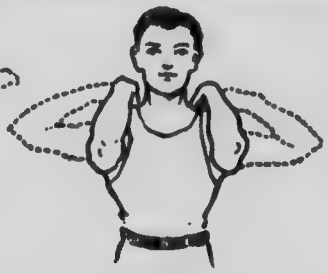
And now in reference to what one should eat. The average boy ought to have and usually does

SETTING-UP EXERCISES

EXERCISE 4

Position: Forearms flexed at side of chest.

Movement: Thrust arms forward and return.



EXERCISE 5

Position: Arms at front, horizontal, forearms flexed, fingers on shoulders.

Movement: Swing to side horizontal and return.

EXERCISE 6

Position: Same as No. 5.

Movement; Swing downward, forward, bringing arms beyond sides of body, raise on toes with end of backward swing.

have an appetite like an ostrich. Three points to remember are: don't eat too much, most healthy boys do; don't eat meat more than once a day; and, third, don't eat anything, even though you like it, that you always taste for several hours after you have eaten it.

The fact that you taste it is an indication that your stomach is having a wrestling match with the food. Some people can't digest onions, others thrive upon them. Some can't eat cucumbers, others can do so readily. The one must give up; the other can continue to eat them. Each person has some

peculiarity of diet, and must observe it to be happy. Many a race has been lost through failure to obey this rule.

A simple diet is best. Most boys eat too much of a mixed nature. They mix pickles, soda water, frankfurters, and chocolate without fear or favor.

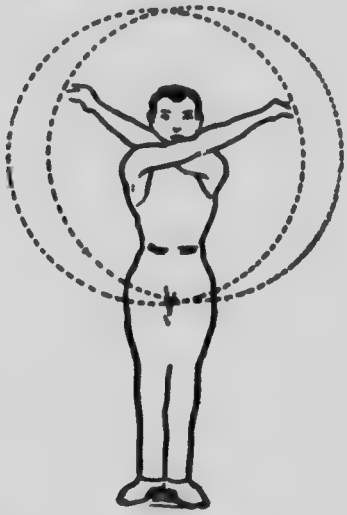
SETTING-UP EXERCISES

EXERCISE 7A

Position: Arms at vertical, thumbs locked, head fixed between arms.

EXERCISE 7B

Movement; Bend forward as far as possible without bending knees and return.



EXERCISE 8

Position: As at 7a but with thumbs not locked.

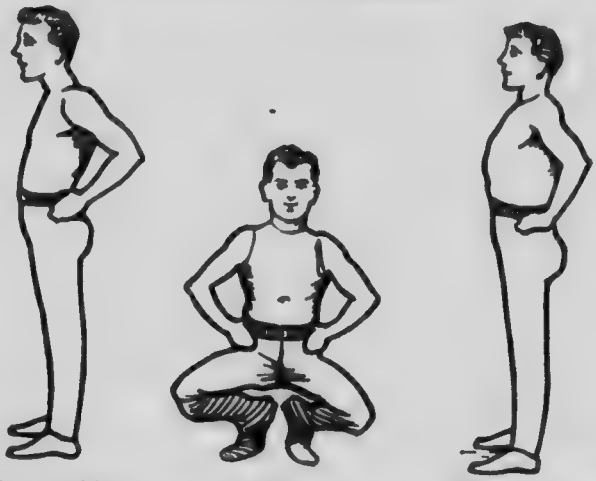
Movement: Arms circles downward, inward, across chest. Reverse the movement.

No wonder there is so much stomach-ache. In boys' camps the chief trouble is indigestion caused by this riot of eating. Such boys are laying up for themselves for the future some beautiful headaches and bilious attacks, which, when they become chronic later, will cry out against them and seriously impair their value. Boys who cook their own meals when in camp should be careful to have their

food well done. Half-baked and soggy food proves indigestible.

Don't eat when very tired; lie down a while and get rested. Don't eat heavily before exercising, or, better, put it the other way around, don't exercise immediately after eating. Never eat when excited or angry, and very lightly when worried or when expecting to study hard. We should learn to eat slowly and chew the food thoroughly, remem-

SETTING-UP EXERCISES



Hips firm position. Incorrect.

EXERCISE 9

Position: Hips firm (hands on hips).

Movement: Full knee bend.

Hips firm position. Correct.

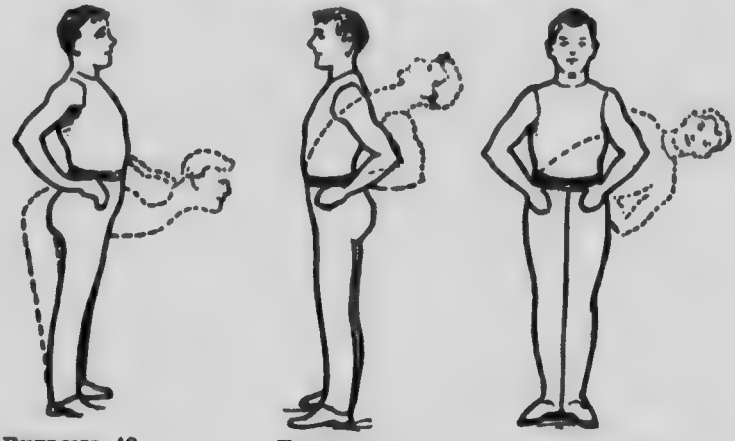
bering that all food before it can be taken up in the blood must be as thin as pea soup. Chewing well will help the digestive organs greatly.

Always wash the hands before eating. Be careful about eating food that has been exposed to the dust unless it has been washed. Drink freely of clean water between meals. Never use a public drinking cup without thoroughly rinsing it. Don't touch your lips to the rim of the cup.

Coffee and Tea

Should a boy drink coffee or tea? This is a question asked by boys. Coffee and tea are the greatest stimulants known. But does a strong boy need a stimulant? What is a stimulant and what does it do? A stimulant is a whip, making the body do more at a given time than it ordinarily would. It doesn't add any fibre to the tissues, doesn't add any strength, isn't a food, but merely

SETTING-UP EXERCISES



EXERCISE 10
Position: Hips firm.
Movement: Forward bend.

EXERCISE 11
Position: Hips firm.
Movement: Backward bend.

EXERCISE 12
Position: Hips firm.
Movement: Sideward bend, right and left.

gets more out of the tissues or nervous system than they would ordinarily yield. Of course there is a reaction, because the tissues have had nothing to feed on.

Herbert Fisher says that Peary's men, who drank lots of tea on their voyage north during the most trying time of their trip, showed it in their haggard faces and loss of tissue. Their tissues had turned cannibal and fed on their own material. Stimulants are not foods. They add no strength to

the body. They exact of the body what ought not to be exacted of it. There is always a reaction and one is always worse off as a result. Growing boys especially should have nothing to do with tea, coffee, or any stimulant.

Alcohol and Tobacco

Alcohol is not a stimulant, but is really a narcotic that is very depressing. It dulls rather than stim-

SETTING-UP EXERCISES

Position: Hips firm.
Movement: Forward lunge on left foot. Repeat to right.

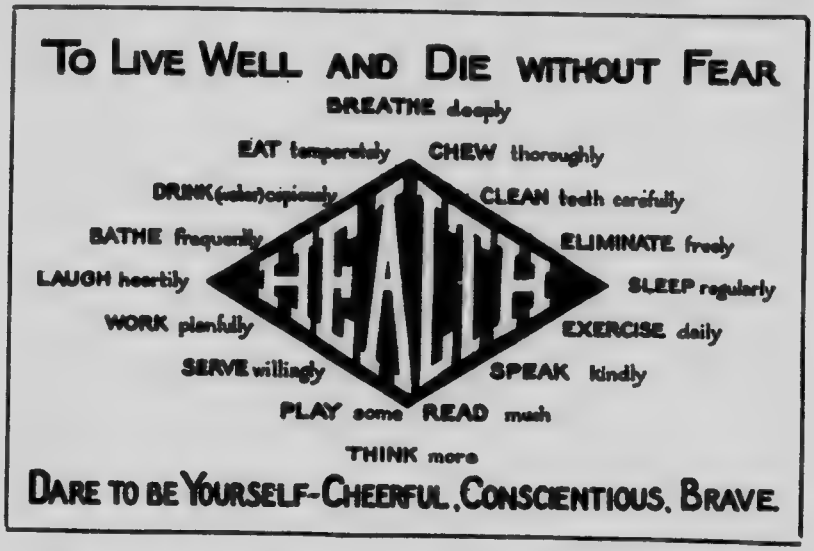
Position: Hips firm; flex left knee and thigh.
Movement: Extend left leg. Repeat same to right.

ulates. The same is true of nicotine in tobacco. No growing boy should use either. The first athletes to drop out of a race are usually drinkers, and all trainers know that smoking is bad for the wind.

Constipation

Those boys who find their digestion sluggish and are troubled with constipation may find the following plan helpful in overcoming the condition :

Drink a cool copious draught of water upon rising. Then take some body-bending exercises. Follow this with the sponge bath. Then, if possible, take a walk around the block before breakfast. After school play some favorite game for at least an hour. In the absence of this, take a good hike of three or four miles or a longer bicycle ride. At least twice a week, if possible, enter a gymnasium class



and make special emphasis of body-bending exercises.

Have a regular time for going to stool. A good plan is to go just before retiring and immediately upon rising. Go even though you feel no desire to do so. A regular habit may be established by this method. Always respond quickly to any call of nature. Toasted bread and graham bread, fruit and the coarser foods will be found helpful.

The Teeth

Food cannot be eaten and digested unless it is first thoroughly masticated with the teeth, so the proper care of the latter is of utmost importance.

Much effort is made to give us pure food and water; but this is of no avail if the mouth is unclean. Fully 90% of children examined in schools have decayed and dirty teeth, which nourish germs, which in turn flood the system with real and active poisons. The way to avoid this is to keep clean the front yard of the temple of the body!

The old-time method of cleansing the teeth by scrubbing them across at right angles is not an efficient method, as it tends to pack in more firmly the particles of food lodged between the teeth and thus help the decay germ to get started. The first requisite is to choose a suitable brush, preferably a small one having the surface of the bristles concave and without any tuft at the end of the brush. The teeth should be brushed after every meal and especially before going to bed. The best method is as follows: starting *on* the gums above the teeth, for the uppers, brush *down* on the outer surfaces, then on the inner surfaces, then back of the front teeth and then along the grinding surfaces of the back teeth. The lowers should be cleaned in the same way excepting that all the brushing should be done with an *upward* stroke. *Do not brush up and down* as this causes the gums to grow away from the necks of the teeth. The gums which hold the teeth must not be neglected. Even though they do bleed when the method described is used, keep right at it, for this will but strengthen and keep firm all the gum tissue. Food should be removed from between the teeth by the careful use of tooth picks and dental floss. The former should be used with caution so that constant usage will not dislodge the fillings. The latter is a waxed thread which may

be obtained at any drug store and should be eased in between the teeth without bruising the gums.

A dentist should be visited every six months so that decay may have no opportunity to make inroads. Never have a tooth extracted unless your dentist advises it.

Care of the Eyes

Most trouble with the eyes come from eye strain. Styes and red lids are usually due to this cause. See how foolish, therefore, it is to treat these conditions as causes, when really they are only the results of something else. Of course there are

C L V F O T

E A C F D L O T

D V C L A E O T F

exceptions. Sometimes wild hairs and skin disease affect the eyes. Eye strain should be removed by wearing well-fitting glasses and then these other conditions will disappear. If constant headache

is experienced or the eyes itch or become tired easily, there is possibly eye strain.

One way to test the eye is for vision. Look at the letters on page 133. If you cannot read the first line at 20 feet, the second line at 15 feet, and the third line at 10 feet clearly with both eyes and with each eye separately, consult a first-class optician.

Never buy eye-glasses fitted by an amateur. Such glasses should be worn in proper relation to the eyes. They should not be permitted to slide forward on the nose or tilt. They may need to be changed often as the eyes grow better.

For reading, a good, steady light is needed. Never sit in front of a window facing it to read. Always have the light come from the rear and over the left shoulder preferably. The book should be held on a level with the face and not too close. Sit erect. Reading when lying down or from the light of a fire-place is unwise.

Care of the Ears

Affections of the ears are exceedingly serious and may lead to grave results. Any trouble with them should be given very prompt attention and a good specialist consulted. Pain in the ear, or ringing or hissing sounds, and particularly any discharge from the ear, should not be neglected. Any sign of deafness must be heeded. Sometimes deafness occurs in reference to some particular sounds, while hearing is normal to others. No matter what the degree of deafness may be, do not neglect to see a physician about it. Ordinarily the tick of a watch can be heard at a distance of thirty inches. If you cannot hear it at that distance and can hear it at fifteen inches then you are just one half from the normal in your hearing. The test should be made with one ear closed.

Ear troubles are often caused by sticking foreign objects in the ear, such as hair-pins, pins, matches, toothpicks, and lead pencils. Never pick the ear with anything. Often the ear drum is pierced in this way. The normal ear does not require anything more than the usual cleansing with the wash rag over the end of the finger.

If wax accumulates to any extent in the ear it should be removed by syringing, but this ought to be done by a physician.

In camp an insect might crawl in the ear and if alive cause pain. Putting oil or other fluids in the ear to drown it is unwise unless done with great care. If a foreign body should get in the ear it should not cause great alarm unless attended with severe pain. If a physician is not available at once such objects may remain for a day or two without serious results. Syringing usually removes them, but it should be remembered that some objects like peas or beans swell if made wet. In swimming, water is apt to get into the ear and cause annoyance. A rubber ear stop can be secured and placed in the ear at the time of swimming, thus keeping the water out. Cotton should not be stuffed into the ear to keep water out, as it may get inside.

One thing to keep in mind is that catarrh of the nose and throat often extends into the ear passages through a tube which reaches from the throat to the ear and that syringing of the nose and throat frequently causes trouble in the ear.

Care of the Nose and Throat

Always breathe through the nose. Air passing through the nose is warmed and moistened and cleaned, thus it gets to the lungs in a better condition. If you cannot breathe clearly through the nose, have it examined. There may be a growth

present which needs to be removed. To become a good runner this is important. Adenoids, which are growths far back in the mouth, often interfere with nose breathing and are serious in other ways. Don't stick anything into the nose; and nose picking is not cleanly. If crusts form in the nose, use a little vaseline to soften them. Don't blow the nose too vigorously. It may cause trouble.

Frequent sore throat may be due to enlarged tonsils which either need treatment or removal. To one who has frequent colds in the head, the out-of-door life, morning sponge bath and moderate eating will be of help.

Care of the Feet

This is an important matter with boys as they will make frequent hikes and tramps. The first thing to do is to walk right. The straight foot is the normal foot. The normal foot is broad at the ball with space between the toes. How different from the awful feet we see with toes twisted upon each other and crowded together. Walk with feet pointing straight forward. The feet that turn outward are weak feet. Shoes therefore should be straight on the inner border, broad across the ball and have a low, broad heel.

When a foot is normal, the inner border does not touch the floor. By wetting the foot one can see readily whether he is flat-footed by the imprint made. The following exercises are good to strengthen the arches of the foot if there is a tendency to flat feet: (1) Turn toes in, raise the heels, and come down slowly on the outer borders of the feet; (2) Walk with heels raised and toes pointing inward, or walk on the outer borders of the foot, inner borders turned up. Never buy plates at a store for flat

feet. They may not be adapted to your needs. Always consult a foot specialist for treatment and buy plates if needed on his order. Only severe cases need plates.

Shoes should fit the feet comfortably. Tight shoes, or shoes that fit loosely, will cause callouses or corns. The way to get rid of these is to remove the cause—namely, the badly fitting shoes. Soft corns are due to pressure between the toes. The toes in such cases should be kept apart with cotton batting. Pointed shoes should be avoided. Patent-leather shoes are non-porous and hot. Ingrown toe nails are exceedingly painful. The pain comes from the nail piercing the soft spots. Allowing the nail to grow long and beyond the point of the tender spot will help; and on the side of the nail and under it cotton batting should be inserted to protect the soft parts.

Hot foot-baths will generally relieve tired feet. Boys should be very careful in trimming corns for fear of blood poisoning.

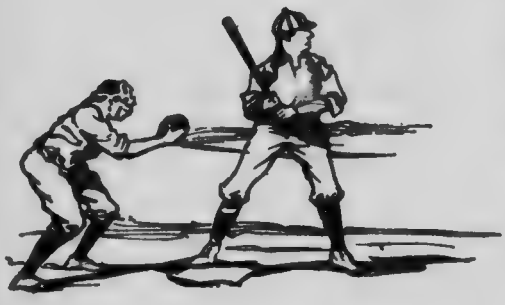
Many boys are troubled with perspiring feet and are frequently annoyed by the odor resulting. Those who are thus troubled should wash the feet often and carefully, especially between the toes. By dusting the feet with boracic acid the odor will disappear. At first it may be necessary to change the stockings daily. In severe cases two pairs of shoes should be used, changing alternately.

Care of the Finger Nails

The chief thing in the care of the finger nails is to keep them clean. Each boy should possess and use a nail brush. Always wash the hands thoroughly before eating, and use the end of a nail file to remove the accumulation still remaining under the nails. Keep the nails properly trimmed. They should

not be too long nor too short. If long they are liable to break and if short to be sensitive.

Biting the nails is a filthy practise that mutilates the fingers dreadfully and makes them unsightly. Sometimes it is a very hard habit to overcome and will require persistent effort in order to succeed. By keeping the nails smooth the tendency to bite them will be to some extent overcome. A bitter application to the nails will often remind one of the habit, as often the biting is done unconsciously.



The nails should never be pared with a knife, a curved pair of scissors is better, as the cutting should be done in a curved direction, but the best method is to use a file. The skin overhanging the nails should be pressed back once a week to keep them shapely. Rubbing the nails with a nail buffer or cloth will keep them polished.

Sleep

One thing a growing boy wants to be "long on" is sleep, and yet he is most apt to be careless about it. It is during sleep that a boy grows most and catches up. During his waking hours he tears down and burns up more tissue than he builds. Good, sound, and sufficient sleep is essential to growth, strength and endurance. "A boy should have at least nine or ten hours' sleep out of every twenty-four." If you lose on this amount on one day, make it up on the next. Whenever unusually tired or when you feel out of trim stay in bed a few hours more if it is possible. A boy should wake up each morning feeling like a fighting cock. When he doesn't he ought to get to bed earlier that night.

Sleep is a wonderful restorative and tonic. It helps to store up energy and conserve strength.

Sleeping Out of Doors

The conditions under which one sleeps are as important as the length of time one sleeps. Many people are finding it wonderfully helpful and invigorating to sleep out of doors. Often a back porch can be arranged, or, in summer, a tent can be pitched in the yard. But, by all means, the sleeping room should be well ventilated. Windows should be thrown wide open. Avoid drafts if the bed is in such relation to the windows as to cause the wind to blow directly on it, a screen can be used to divert it or a sheet hung up as protection. Good, fresh, cool air is a splendid tonic. In winter, open windows are a splendid preparation for camping out in summer.

Conservation

In this chapter much has been said of the active measures which a boy should take in order to become strong and well. We should be equally concerned in saving and storing up natural forces we already have. In the body of every boy who has reached his teens, the Creator of the universe has sown a very important fluid. This fluid is the most wonderful material in all the physical world. Some parts of it find their way into the blood, and through the blood give tone to the muscles, power to the brain, and strength to the nerves. This fluid is the sex fluid. When this fluid appears in a boy's body, it works a wonderful change in him. His chest deepens, his shoulders broaden, his voice changes, his ideals are changed and enlarged. It gives him the capacity for deep feeling, for rich emotion. Pity the boy, therefore, who has wrong ideas of this important function, because they will lower his ideals of life. These organs actually secrete into the blood material that makes a boy

manly, strong and noble. Any habit which a boy has that causes this fluid to be discharged from the body tends to weaken his strength, to make him less able to resist disease and often unfortunately fastens upon him habits which later in his life can be broken only with great difficulty. Even several years before this fluid appears in the body such habits are harmful to a growing boy.

To become strong, therefore, one must be pure in thought and clean in habit. This power which I have spoken of must be conserved, because this sex function is so deep and strong that there will come a time when temptation to wrong habits will be very powerful. But remember that to yield means to sacrifice strength and power and manliness.

Tuxis Boys who desire to know more of this subject are referred to the articles on sex education.

Swimming and Life Saving

By W. W. Winterburn

Instructor in Swimming, Central Branch of the Toronto Young Men's Christian Association

ONE of the greatest joy bringers in a boy's life is the old swimming hole. Boys who are not fortunate enough to get to a real, outdoor, country swimming hole or beach, but who have the privilege of using a city "Natatorium" or swimming tank, prove the truth of the statement. Almost any day, winter or summer, when one of these swimming pools is open to boys, you will find it

full of diving, swimming, moving arms and legs—attached to swimmers. It's great fun.

The fun comes not simply from the pleasant feel of cool water on the skin. The fun comes also because there is a joy in the sense of achievement. The mastery of anything brings satisfaction—a feeling of power and real joy.

THE OLD SWIMMING HOLE

Dog paddling around is all right, but the mastery of the art of swimming and, therefore, the greater pleasure, comes when one can properly use the more scientific strokes, such as the crawl, which give greater speed and power with no more effort.

Every boy should know how to swim, not only because it is good sport but also because swimming is one of the best-known forms of all-round exercise. Swimming does not develop one set of muscles at the expense of others. All are used. Swimming is an exercise in which one may indulge without fear of muscular strain.

And every boy can learn to swim if he can get to enough water. In these days, the methods of

instruction have been so simplified and made clear, that everyone who really tries, quickly learns. If middle-aged peopie who are generally supposed to be past the time of life for learning new tricks can learn to swim—and hundreds do every year—every Canadian boy can.

Swimming is coming to be looked upon as an important part of education. You know, of course, that education does not consist simply in the learning of facts nor in increasing mental ability to analyze and construct, but true education teaches one how to live. Swimming increases will power, self-reliance and courage, and that is the finest kind of education, for it develops the qualities which help us to live as we ought.

In this period of the world's history, when the Great War has to some extent forced home to us the realization of how valuable men are, we must all do our utmost to conserve human life. Our country's resources of man-power—leadership power—have been disastrously reduced. Human life is one of the most valuable things in the world.

Is it not a duty for every Canadian boy to learn an art which may not only be the means some day of preserving his own life, but which, if carried on to its highest form of service in the knowledge of life saving, may enable him to actually save the life of some other?

Learn to swim. Learn to swim better. Learn to rescue the drowning and to resuscitate the apparently drowned. It is achievement, it is power, it is training for service—and not the least, it is great fun.

Swimming Strokes

We are in a period of evolution of swimming strokes. We are progressing from strokes where the limbs recover in the water to strokes where

the limbs recover out of the water. There are many such, including the breast, side, side overarm, trudgeon, crawl and combination strokes as well as the various back strokes. This leads up to the question as to which stroke should be mastered first. The introduction of the crawl stroke as a means of teaching the beginner has revolutionized the system of instruction and learning and made it so easy that any boy can learn the crawl stroke. The movements are simple, easily dissected and can be learned by means of a land drill without much effort. The timing and movements of the arm and leg motions closely resemble the dog paddle or primitive man's natural stroke. After the crawl stroke has been mastered, the breast and trudgeon strokes can be learned. Finally the advanced grade can be entered, in which speed swimming can be learned. While there are not hard and fast rules laid down for learning, there are certain things that should be kept in mind, such as the correct position of the body, the drive or thrash of the legs, the arm pulling and recovering, relaxation and correct breathing.

In order that every TUXIS BOY may get correct swimming movements, the land drills of the crawl stroke and of the breast stroke are given, together with the correct method of breathing. The proper position of the body is one-third of the art of swimming; knowing and using the correct movements is another third and regular rythmic breathing is the remaining third.

Crawl Stroke—Arm Motion

Position. Stand astride, then bend the body forward from the waist until the shoulders are at an imaginary water level. Raise one arm forward and in a line with the shoulder, and extend the other arm downward to the rear, next move the arms and shoulders down, back and up, left hand upwards

and forwards, right hand downward and backward. Continue the motions remembering to keep the arms the same relative distance apart, one hand up in the air, the other lowered and close to the body, wrists bent and fingers closed in order to grip the water, legs trailed behind, heels together, toes pointed.

There is no land motion for the leg motion. This may be likened to a vertical opening and shutting of a pair of scissors, except that when the legs are snapped, the feet are allowed to cross so that they can return a moment later. The legs are kept as straight as possible with the exception of a *slight bending back* of the shin and instep. The legs should not be held stiff, but controlled enough to prevent sloppy motions. The feet are moved about four to six inches up and down, producing what may be called a number of scissor actions. Toes kept in and feet together. The number of drives depends upon the build of the swimmer, as for example, a person with unusually powerful legs can adopt a more vigorous action than one with short legs.

The Land Drill for the Breast Stroke

Position. Hands on hips, head erect, shoulders back.

LEG MOVEMENTS

1. Raise the left knee directing it sideways, the heel of the left foot touching the inside of the right knee, toes pointing downward.

2. Straighten and lower the left leg by a backward and downward movement until the point of the big toe touches the ground one pace to the left.

3. Draw the foot smartly along the ground to the right foot.

Perform the movements three or four times,

and repeat with the right leg. Then when proficient, perform the movements with the right and left legs alternately, emphasizing movements 2 and 3.

ARM MOVEMENT

Position. Stride Stand.

Raise the hands forward in a direct line with the chest, palms downward.

1. Sweep the hands around in a quarter circle, right and left, until they are in line with each other, level with the shoulder, back of hands being to the front.

2. Bring hands together in front of the chest, thumbs touching elbows close to sides of chest, palms down.

3. Shoot the hands forward to position.

Perform the movements 3 or 4 times until familiar with them.

COMBINED ARM AND LEG MOVEMENT

Position. Feet together, arms forward raised.

1. Sweep the hands around right and left, and raise right or left knee, heel of foot touching inside of opposite knee.

2. Hands together in front of chest, leg straightened and lowered to ground one pace sideward.

3. Hands forward to position. Feet drawn along ground to the other foot. Perform the movements until proficient.

Breathing

Two of the most important things to remember when learning to swim are:

1. Keep the eyes open when in the water.
2. Keep breathing.

No. 1 needs no explaining. Try it once.

Swimming is, perhaps, more than any branch of physical exercise, an extensive rhythmic breathing exercise, and a person who can easily breath in the water has gone a long way towards becoming absolutely at home in the water. In swimming, the natural process of breathing is reversed. The air is drawn *in* through the *mouth* and exhaled *through* the *nose* when the face is below the surface.

The reasons for this change are apparent when one takes into consideration the anatomy of the nose and mouth. If air was drawn in through the nostrils a certain amount of water would be also, and this would speedily set up a certain amount of local irritation at the top of the nose whereas breathing out through the nose ensures a pressure of air outward. Little or no water enters the mouth, as the tongue and lips can act as valves and control the opening through which the air is drawn in.

To practice breathing, stand up in the water, keeping the feet on the bottom and take a good breath. Place the head in the water and force the air through the nose. Raise the head; breathe in (through the mouth) and again repeat the process of forcing the air out when the head is down. If bathing privileges are not convenient, secure a bowl or basin full of water and practise in that. Practice until the habit of breathing *in* through the *mouth* and breathing *out* through the *nose* is *formed*.

A few words may be said regarding supports. All artificial aids to swimming should be discouraged as much as possible. With their aid, a person can only be buoyed up. The old cork floats, pulleys, slings, etc., gave a very limited amount of freedom to the body and have long since been consigned to the rubbish heap. The most modern aid to instruction at the present time is a pair of cotton water wings. They are light and durable, and placed under the hips permit the pupil to give all his attention to the movements, as well as allowing more freedom

and progress through the water. After a fellow has perfected the arm and leg movements, the wings are soon discarded, in fact a boy's own natural pride is quite sufficient to make him desire to swim unaided.

Learn to swim, therefore, for these reasons. It is a splendid form of exercise, it gives one courage, self-reliance, health, strength and ease of carriage, all of which help in making character, and finally, it may prove to be the means of saving a human life.

LIFE-SAVING

When one speaks of Life Saving to some boys they say: "Why should I learn Life Saving? Is it not *enough for me to learn how to swim?*"

Why should a boy understand Life Saving? Because it is the duty of everyone to be ready and willing to help a person in distress and especially to be able to render assistance in case of drowning. The Royal Life Saving Society was organized as a result of that thought. One of the greatest assets that we can have in our lives is the knowledge that we know how to render a great piece of service to our fellows. Life Saving is a service agency of the highest and noblest kind.

A boy who had rescued his chum from drowning was asked if he was not afraid to jump in after his friend and his reply was, "No, sir, I knew just what to do, and had learnt how to do it at the ——— Y.M.C.A." He *knew what to do* and how to do it and was not afraid.

Harrington Emerson, the personal efficiency scientist, said in one of his lessons that we should find and take the best, easiest and quickest ways if we are to get the best results, and this applies to Life Saving just as much as to business. The Royal Life Saving Society in their handbook have given the best, easiest and quickest ways of helping a drowning person, of releasing oneself if clutched by the

drowning person, and the latest method of resuscitation—the Prone or Schafer method.

METHODS OF RESCUE

There are five methods of carrying a person in the water and are as follows:

When the drowning person is not struggling turn him on his back, place your hands on either side of his face, hold him in front of you and swim with the back stroke.

In case of struggling, take a firm hold of the upper arms, and swim as before with the back stroke.

If it is hard to grasp the arms, slip your hands under the arm pits and place them on his chest.

If a swimmer is taken with cramps or becomes exhausted, the person *assisted* must place his hands upon the rescuer's shoulders and lie on his back, perfectly still, with the head held well back. The rescuer swims with the breast stroke and pushes the assisted person without very much exertion.

The last method is to place one arm over his shoulder, with your hand under the opposite armpit. This allows a rescuer to swim with the side stroke.

METHODS OF RELEASE

The three methods recommended for effecting a release are:

When caught by the wrists, turn both arms against his thumbs swinging down and out. This action will dislocate his thumbs if he does not let go.

If clutched around the neck place one hand in the small of the person's back, raise the other arm and pass it outside the drowning person's arm. Then pinch the nostrils with the first and second fingers, at the same time placing the palm of the hand over the mouth thus cutting off the breathing. Push the face outwards and the rescuer will break the grasp.

If clutched around the body, lean well over the drowning person, get the same grasp on the chin and back, at the same time bringing the knee up against the lower abdomen.

RESUSCITATION

Of all methods of resuscitation yet invented, the Schafer, or Prone Pressure method has been proven the best. It is simple, can be applied by one person, and is most effective in its results, and can be understood very easily.

Shafer Method of Resuscitation (a)

When a person is taken out of the water apparently drowned no time must be lost, but the method of resuscitation put into operation at once, as every minute is precious and delay is serious.

Place the body face downwards, the mouth raised about three inches from the ground. This is to allow water that has been swallowed to escape, next straddle the patient in a kneeling position facing his head. Place your hands in the small of his back with the thumbs pointing towards the head, and the fingers spread out on each side of the body around the ribs. Lean forward and steadily press downwards, without taking your hands off the body, rapidly release the pressure. Repeat this forward and backward movement every four or five seconds until natural breathing is restored. This may take three or four hours.

Schafer Method of Resuscitation (b)

Many a life has been saved by a knowledge of these methods. All that is necessary is a little study and practice.

This is just a brief outline of the instruction and courses as outlined in the text book of the Royal Life Saving Society. There the methods of rescue, release and resuscitation are given in detail with land drills. Following the methods outlined there will enable every TUXIS BOY to understand the best way of rendering assistance. With this knowledge a moderate swimmer can fearlessly go to the aid of a drowning person.

Further information regarding the work of the Royal Life Saving Seciety may be obtained from the nearest Provincial Society.

Provincial Secretaries of
The Royal Life Saving Society

ONTARIO
W. W. Winterburn
Central Y.M.C.A.
40 College Street
Toronto

BRITISH COLUMBIA
C. E. Hopper
131 Wellington Avenue
Victoria, B.C.

QUEBEC
L. G. Norris
P.O. Box 2332
Montreal

MANITOBA
R. E. Collings
P.O. Box 1495
Winnipeg

The following books on swimming and life saving are recommended.

"The Royal Life-Saving Society Text Book of Instructions."

"At Home in the Water," G. H. Corson, Association Press, New York City.

"Speed Swimming," Daniels, American Sports Co., New York.

"Swimming," H. W. & A. Sinclair, Badmington Library, Little, Brown & Co., Boston.

"How to Swim," Sterrett, American Sports Co., New York City.

CHAPTER IX

SAFETY FOR LIFE AND LIMB

Safety First

By R. T. Wyse, Toronto, Ont.

FIFTY per cent. of the deaths by accident are entirely unnecessary—a sad commentary on the law that "Self-preservation is the first law of life." Life should not be risked except for a great cause, but many of us do it continually and thoughtlessly with no other purpose than unnecessarily saving a little time. Alertness as to personal safety has been dulled by the protections of civilization by which man feels himself surrounded. This and the selfishness which makes us heedless of our responsibility for our brother's life, are the causes of most of the dangers which surround us.

If we were to thoughtfully plan to live more wisely in this regard, and to take no chances for ourselves or others we would find immediately that we have much to learn. Our education has been much at fault. Most of us have not been taught those things about our personal well-being and safety that are vital. Herbert Spencer in his book on "Education" writes most scathingly. "Do but consider for a moment—that there are twenty ways of going wrong to one way of going

right; and you will get some idea of the enormous mischief that is almost everywhere inflicted by the thoughtless, haphazard system in common use." He then refers to the savages who in a cold climate reject warm blankets for a string of beads, and says our mental preferences in education are just as barbaric and unreasonable, as most of us prefer to shine and make ourselves conspicuous by exhibiting a knowledge of impressive but unpractical learning while utterly neglecting training in the things that are vitally necessary.

Accidents go on increasing—almost as destructive during each year of peace as if a great war were going on. Though sanitary laws and protective devices increase, inventions involving danger also increase. In the United States alone over 2,000,000 accidents occur yearly.

Falls

The highest toll is from falls. As half of all these are unnecessary, the majority must be from the foolishness of taking chances or the selfishness of not considering the safety of others. Men working in high places without proper protection against falling or without nets provided in case of a fall; the improper placing of ladders (ladders constituting one-third of accidents from falls); the falling on sharp instruments (pitch-forks sharp tools, boards with nails up, rakes, etc.); trap doors left open; holes or excavations of any kind left uncovered or unlighted; rope or wire left in dangerous places; cellar or attic stairs not properly lighted, etc., cause most of these accidents. Many falls are occasioned by the slovenly and selfish habit of leaving someone else to clear away the confusion and littered condition you have yourself created. Myriads of small things, as the banana peel on the sidewalk, a loose heel on the shoe, icy steps with

no ashes thrown upon them, and so on, account for many falls.

Accidents on Railways

The next largest number occur on railways.

While the railroad management is held responsible, some individual employee is generally to blame. But outside of those injured while legitimately traveling on the railway or those injured in the employ of the railway, fourteen people are killed every day by trepassing. *Keep off the track.*

Do not use the railway track as a route to travel on even for a short distance, and do not use railway bridges no matter how long a detour you may have to make. Keep out of railroad yards. Do not board or leave a moving train nor crawl under lowered gates.

Drowning

The next largest number of deaths from accidents yearly is from drowning. Naturally the answer is *learn to swim.* Learning to swim should be compulsory and the ability to swim as universal as walking, for man is often helpless on and in the water if he does not know how to swim.

If you want to own a canoe, make up your mind to learn to swim *first* and to paddle *afterwards.* People usually reverse the order. No one should take out in a canoe anyone who cannot swim. Canoes may be upset by such trifles as a violent fit of laughter. Don't take chances with the weather, especially on the large lakes. Consult some old sailor or experienced shore-hand if the water looks at all rough or the wind is high. It is the *greenhorn* who takes risks, especially with horses and boats, which are uncertain elements. An old sailor can always give you good advice. I saw two young men drowned within half an hour

after laughing at the warning of an old sailor. I had intended to go out but saw that the wind was blowing strong off shore and heard the old man advising those fellows, both of whom could swim and paddle. It became still rougher and the wind was so strong off-shore that they could not get back. In canoes or rowboats, people should absolutely never change seats.

On the lakes in rough weather, a motor boat that is too large to be handled with oars must be carefully managed for if the engines go wrong in such a craft, you are more helpless than you are in a rowboat which by skill and strength you can, in ordinary seas, keep at right angles with the waves. Even if you ship some water in a rowboat, you are comparatively safe if you take the waves as nearly at right angles as possible, riding straight over them, not between them. If you once lie in the trough of the sea, you are in great danger and that is what happens to the motor boat if it becomes helpless.

In swimming do not go out far unless you are in hailing distance of boats or other swimmers for in our cold waters cramps are possible even to the best swimmers who should always be escorted on long swims even when keeping comparatively near shore though, of course, in deep water. No one should be so foolhardy as to go in swimming from a shore with no one in sight. Unless you are a good swimmer, do not go in any water until you *know* the character of the bottom. Avoid any place where there is an undertow. Learn to swim on your back and to float, as without this knowledge you are very little use to yourself and others in any real emergency.

Fire

The next largest number of accidents is from fire—more than 50% unnecessary. Even when it is caused by wiring it is often from careless work.

All closets, cupboards, attics, etc., should be kept clean and free from litter.

Keep matches in a covered metal box. Be most careful how you dispose of a lighted match. Avoid taking ashes from stove or furnace until they are cold. Do not take a lighted match into a room in which you smell gas. When at any hotel, notice the location of fire escapes and stairs and which passages lead to them. Smoking should never be allowed in a stable or in a garage where gasoline is in large quantities.

If the house in which you are, or any person or thing in it, catches fire, close doors and windows promptly to exclude draft and smother the fire with rugs or bedding or garments, preferably of wool.

The practice of closing as many doors as possible at night, particularly the kitchen door, is a good precaution. Never leave any halls or passage-ways obstructed after dark.

Camp-fires must be entirely extinguished before leaving camp. Carelessness in this matter is a criminal offence, as some of our most disastrous forest fires are started in this way.

If your clothing catches fire, never run for assistance. If there is nothing at hand with which to wrap yourself to smother it, lie down and roll over slowly, beating and fighting the flames with your hands and arms. Do exactly the same to anyone else.

Do not jump from windows of burning buildings, unless it is the only means of escape. Within six inches of the floor there will be no smoke to speak of, so crawl along with your face as near the floor as possible. If you can wring your handkerchief in water and tie it over your mouth and nose you will find it an effective mask.

If you see a burning building, alarm the inmates and then ring the fire alarm. Outside a burning

house borrow bedding, mattress and pillows from the neighborhood and place under windows at which people are seen. In case of fire, always think of others beside yourself in making your escape and do your share of warning or assisting.

Be careful not to spill gasoline in using it and never use it near fires or lamps, or in a closed room.

Gasoline also should never be stored except in approved receptacles. Burn up any oily rags as soon as you have used them, as spontaneous combustion is liable to take place.

Keep others from panic and do not lose your head.

Poisons

Poisons should never be kept with harmless things. Always put them in a special place, preferably under lock and key. Bottles should have some distinctive color or shape.

For poisons, take an emetic immediately, salt or mustard water being the most common available. An acid is an exception to this rule. Swallow in this case white of egg, flour and water, or milk in quantities to neutralize the acid. For an alkali, take lemon juice or vinegar.

There are myriad forms of menace to life everywhere which, if enumerated, would fill a volume. These are merely a few suggestions. Safety instructions and protection in industrial work form a separate subject by itself. What people are now organizing to accomplish is a universal training by which we may be quick, alert to see danger signals, and thus avoid danger. We must educate ourselves to be a protection to others as well as to ourselves. As a result of the present crusade accidents are beginning to show a decrease. The necessary persistent labor entailed has been against apathy—lack of appreciation and even ridicule.

The Ontario Safety League has been the pioneer

of the movement for accident prevention in this country. It has assumed the initial labor of educating the public, trying to reach the homes through the children in the schools, by bulletins, lectures, moving pictures, etc.

We want first of all to rid ourselves of one of the besetting sins of our age—the habit of undue haste. This is a fertile cause of many of the foolish things people do. In order to promote safety, we need to cultivate:

1. Observation.
2. Mental alertness (to [illegible] and act quickly).
3. Unselfishness (which constitutes us our brother's keeper).
4. The necessary knowledge of what to do in an emergency.

First Aid to the Injured

By Q.M.S. R. C. Wood
Chief Instructor of First Aid, Military District No. 2, Author of "The Soldier's First Aid."

THE intention is to give TUXIS BOYS a simple treatise dealing with some elementary principles of the subject, a knowledge of which will prevent improper treatment in an emergency and enable First Aid of the right kind to be administered. It is hoped to arouse a desire for a more complete knowledge of the subject, the importance of which is recognized more to-day than ever before.

General Principles

In dealing with an emergency, such as an accident or sudden illness, the First Aider must keep cool and not fluster and excite the patient. First, find out what is wrong. This can be done by observing the condition of the patient or by carefully questioning him or persons present, or by noticing anything unusual at the spot where the occurrence took place, a damaged rig, or auto for example.

Always stop any bleeding before anything else is done; how to do this is dealt with further on.

It is essential at all times to place the patient in a comfortable position. In all cases loosen the clothing at the neck and waist. If face is pale, the head should be kept low, if flushed, both the head and shoulders slightly raised.

In cases of insensibility do not permit anything to be given to the patient by the mouth as it might choke him. Do not use any alcoholic liquor for a stimulant except under doctor's orders or in extreme case of collapse.

Send for a doctor if case demands it—do not try to be a doctor. First Aid briefly means simple but prompt and accurate treatment at the spot and at the moment of the emergency. This means preventive work, treating patient so that his injuries are not made worse while being moved to his home or to the hospital.

Do not fail to keep the patient warm by covering him with whatever is available, such as coats, etc., thus treating for shock. Further, in all cases where the patient has ceased to breathe as a result of immersion in water (bathing), electric shock, choking, or a violent blow on the head, artificial respiration should be performed without a moment's delay, as time is essential.

When a wound has to be dressed (that means

where the skin is broken) great care must be taken to keep it as clean as possible, as blood poisoning is likely to occur. When possible, swab the wound with Iodine or Hydrogen Peroxide. Never wash a wound with water.

Exposing wounds so that they can be dressed must be done with great care, otherwise, they may be greatly aggravated and the patient suffer needlessly in consequence. Do not hesitate to use your knife in cutting the clothing regardless of the fact that you are probably ruining the garment. Do this if there is the slightest risk that by any other method you will give the patient unnecessary pain, or make the injury worse. With boots, cut the laces completely through; they will then drop off. When you can safely remove a coat, *take out the sound arm first.*

Fractures

A fracture means a break; for instance, a fractured leg means that a bone is broken in the leg. Fractures are of three kinds: 1. Simple—meaning a clean break of the bone and nothing more. 2. Compound—indicating either that the bone has pierced the skin, or that there is an opening leading down to the seat of the fracture (such would be caused by a bullet) through which germs might pass and cause blood poisoning. 3. Complicated—meaning that the arteries, veins or tissues have been torn or internal organs lacerated, as happens sometimes in the case of the ribs. It is very essential that care should be exercised to prevent what was a simple fracture at the time of the injury, becoming compound, a circumstance that, unfortunately, often happens as a result of improper handling by the helpers, or injudicious movement on the part of the patient. Where possible, fractures should be treated on the spot, the object being to prevent movement of and to give rest and support to the broken parts.

SIGNS OF FRACTURES

By carefully observing, one may recognize a fracture by the pain and swelling at the seat of the fracture, by movement where there should be none, by unnatural shape, by grating of the bones which can be sometimes both felt and heard, by loss of power or use, and by possible shortening of the limb. If you suspect that a fracture is present treat the patient for one. Take no chances.

TREATMENT OF FRACTURES

When two splints are used in the treatment of a fracture, they should be placed opposite each other, the limb being between. To keep the splints in position, always tie the bandage first above the break, leave a small space at the injured part, next tie below the break. Thus the broken parts will not move. Tie all bandages tight enough only to keep splints in position. For splints, odd pieces of wood, folded newspapers, canes, umbrellas, etc., may be used. For bandages, use handkerchiefs, string, neckties, belts, etc.

FRACTURED RIBS

A complicated fracture of the ribs calls for special treatment. The signs of it in addition to the ones previously mentioned are that the patient coughs and spits blood, which is either bright red and frothy indicating that the lungs have been pierced, or dark brown, similar to coffee grounds and possibly mixed with food, indicating that it is coming from the stomach. Promptly lay the patient down, inclining him to the injured side, supporting him at the back with a couple of coats. This will enable him to breath more freely, and thus ease the pain. Loosen the clothing, and see that he is comfortable and covered warmly. Place the arm of the injured side in a sling. Should his condition get more

serious and he gives signs of collapse, treat him for internal hemorrhage.

FRACTURED JAW

A fractured jaw gives considerable pain, and can be readily recognized. The patient will probably be supporting his chin in his hand, the teeth being uneven, his speech indistinct, and a little blood issuing from the mouth.

Proceed as follows: Fold a handkerchief as you would a muffler for the neck making it about three inches wide. Tie a knot about four inches from each end, the space between the knots not to be more than nine inches or less than six. Join it to another handkerchief to give additional length. Open the fold or pocket between the knots and place the point of the patient's chin in this pocket. Pass the second handkerchief over the top of the head and tie off on the opposite side close to the ear; then spread out as much as possible the part of the handkerchief that is over the top of the head. The knot of the pocket on the injured side of the face should not come near the fracture.

Dislocations

A dislocation means that the bones constituting a joint have been displaced, the indications of this being pain, swelling, complete immovability of the part, and the irregularity of the joint when compared with the corresponding sound one. The only treatment a "First Aider" should give for a dislocation is to rest and support the part in the position desired by the patient, and prevent any possible movement. Do not attempt to put the bones in their proper position. If you are not certain whether the injury is a fracture or a dislocation, treat the patient for a fracture so as to be on the safe side.

Bleeding and How to Stop It

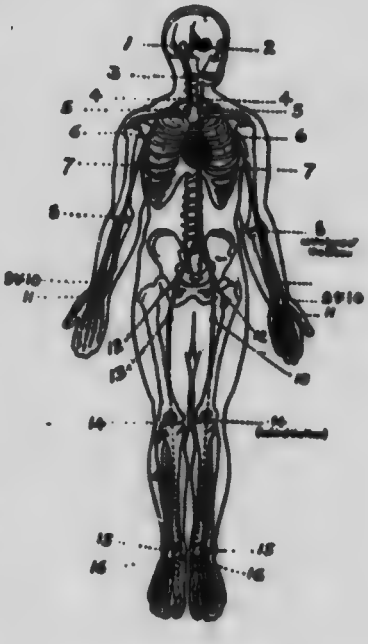
Examine a patient carefully and quickly to find out if he is bleeding from an unseen or unknown injury. This must be attended to immediately, because no matter what the injury may be, bleeding must be stopped first. To be efficient in rendering First Aid it should be understood that the blood in the body flows in two directions, that in the arteries flowing from the heart, and that in the veins flowing to the heart. Blood from an artery is bright scarlet in color, and comes from the heart side of the wound in jerks or spurts. Blood from a vein is dark red in color, tinged with blue or purple, and flows in a steady stream from the far side of the wound, away from the heart. The heart pumps less blood when the patient is sitting, and less still when he is lying down. Therefore, lay the patient down and raise the limb, (if it be one) unless it is fractured. Expose the wound and apply pressure close to the wound with the thumbs (if an artery, on the heart side; if a vein on the far side). Place dressing squarely on the wound, then a bandage; tying a knot loosely on top of the wound, placing under a stone or other smooth hard substance wrapped in a handkerchief, so forming a pad to assist the direct pressure on the wound. When the hard pad is in position, tie the knot sufficiently tight to stop the bleeding, but no tighter, as there is a danger of the wound swelling and thus causing constriction. This method will stop any blood coming from a wound that is not a large one, or that is not complicated by a fracture or piece of glass.

Pressure Points

When the bleeding wound is complicated in the manner above indicated, pressure must be placed on what is termed a pressure point, that is, a place

where an artery passes close to or over a bone. The arteries are like rubber tubes, and can be readily pressed against some hard substance like a bone; when this is done no blood can pass that particular point. Pressure can be put on these various points by fingers and thumbs, pad and bandage, tourniquet or by bending the limb, according to where the point is located. In most cases the pressure point nearest the wound between the heart and the wound should be used.

The pressure points in the head are six: No. 1 two fingers breadth behind the ears on each side; No. 2 each side of forehead in line with the eyes; No. 3 about the centre of each side of the lower jaw, where the groove can be felt. Except in the case of No. 1 the blood can be readily felt passing the spots quite easily. The pressure of the fingers, or the thumbs, will readily stop any wastage of blood from a wound above these points. If necessary, small pads can be applied and tied on with a handkerchief.



The Pressure Points

PRESSURE POINTS OF THE NECK

There are two, (No. 4) being found each side of "Adam's Apple," where the rapid coursing of the blood can be readily felt. For a wound in the neck, or fractured jaw, pressure with the thumb on the side affected will give the desired results.

In some cases of neck wound pressure may have to be applied above and below, to stop the wastage. Only thumbs can be used, bandages being impossible. Care must be exercised not to choke the patient.

PRESSURE POINT OF THE SHOULDER

Pressure point No. 5 located on each side of the base of the neck. The throbbing can be felt by placing the thumb behind the collar-bone and pressing on the top rib. The most direct pressure can be obtained here by standing at the back or side of the patient and inclining his head to the side injured. This pressure point is vitally important, as the artery here passes across the shoulder and down the arm. Should a badly injured shoulder or the top of the arm be accompanied by bleeding the flow can be stopped forthwith even by the patient himself. Thumb pressure has to be maintained until the artery closes or medical assistance can be procured. Its application is extremely simple.

PRESSURE POINT OF THE ARM-PIT

Pressure Point No. 6 is located under each arm-pit, at which spot a hard pad, the size of a billiard-ball, should be placed. Next pass the centre of the bandage tight up against the pad, crossing the ends on the shoulder, bringing sufficient pressure to bear on the artery to stop the bleeding. Then pass one end across the chest, and the other across the back, tying off under the opposite arm-pit. Ease this every thirty minutes. If the arm affected is not broken, the forearm should be tied across the body, thus increasing the effectiveness of the pad. Pressure at this point is to be used only when the arm is bleeding from a "complicated wound."

PRESSURE POINT OF THE ARM

Pressure point No. 7 is situated in the centre of the arm on the inside in line with the seam of the coat sleeve. The passage of blood down the arm can be instantly stopped by grasping the arm at this point, thumb outside and fingers inside, gripping firmly and giving the hand a slight twist away from the patient. This stoppage can be made permanent by the application of a tourniquet which can be made with a knotted handkerchief using a stone or other hard substance for a pad. Tie a handerkerchief over the pad, which had been placed in line with the inside seam of the sleeve. Then put a short stick, in the knot on the opposite side of the pad, and twist it around until the artery has been compressed. To keep the stick from flying back and releasing the pressure, tie it to the arm with another handkerchief. Ease every thirty minutes.

PRESSURE POINT OF THE ELBOW

Pressure point No. 8 is in the bend of the elbow. Place a hard pad in the point or, failing a pad, roll up the sleeve, raise the forearm, and tie a bandage around both the arm and the forearm at the wrist, crossing the bandage between the two in the centre. Ease every thirty minutes.

PRESSURE POINTS OF THE WRIST

Pressure points Nos. 9 and 10 are at the wrist, over the side, and about an inch and a half from the junction of the hand and the wrist. In the event of a fracture, a crushed hand, or a hand cut off, pressure can easily be applied at these points with the thumbs, and later by two small pads tied firmly on with a handkerchief. Ease every thirty minutes, unless hand is off.

PRESSURE POINTS OF THE HAND

Pressure point No. 11 is in the hand. If the wound is free from complications swab with Iodine or Peroxide, place a clean dressing in the patient's hand, *first putting some hard substance inside.* Get the patient to close his fist over it, and tie firmly with two handkerchiefs or a bandage. Place the forearm against the breast, the hand reaching to the opposite shoulder, and use bandages to keep the arm in position.

PRESSURE POINT OF THE GROIN

Pressure point No. 12 is in the groin. Pressure can be applied here only with the thumbs placed one on the other, first elevating the leg, unless it is broken. Get relief when fatigued and await the doctor; kneeling on the left knee and resting the injured leg on your right thigh is a good position to take. The exact spot to press is where you can feel the hip bone in the centre of the crease that is made where the thigh joins the trunk, the bone at this point being like the edge of a thick plate. More blood can be lost in a shorter time from this artery than from any other, excepting the main artery of the body; therefore great promptitude is necessary. It may not be advisable even to expose the wound, as less than a minute of bleeding is sufficient to cause fatal results.

PRESSURE POINT OF THE KNEE

Pressure point No. 13 is one-third of the distance down from the groin to the knee, on the inside. Place the pad, bandage, and stick for twisting in the same manner as for the arm, (See pressure point No. 7). Ease every thirty minutes. Pressure Point No. 14 is in the bend of the knee. First place a pad in the joint, or turning up the pants and

bending the knee, secure it as in the case of the elbow. See pressure point No. 8. Ease every thirty minutes.

PRESSURE POINTS OF THE FOOT

Pressure points Nos. 15 and 16 are located at the bottom of the leg, where the second or third lace hole of the boot comes, and under the ankle on the inside. Thumb pressure, then pads and handkerchief, the leg being kept raised, will be sufficient.

Burst Varicose Veins

Burst varicose veins are extremely dangerous, because the blood pours out from both sides of the wound, on account of the valves ceasing to act. Lay the patient down: raise the limb; expose the wound; apply thumb pressure on each side of the wound; place a pad and a bandage on the wound; then place a bandage tightly around the leg below the wound and another above. Keep leg elevated.

Unconscious Person

Insensibility, or unconsciousness, may occur through many causes. First look for hemorrhage, and if present, stop it. If the cause is known, endeavor to remove it. If the cause is not known after the search for bleeding, observe his pulse, breathing, condition of face whether pale, flushed, or damp and clammy, his eyes, and his mouth.

If not breathing, perform artificial respiration. For concussion and compression and unknown cause, ease the clothing, keep warm; raise the head and shoulders slightly, if the face is flushed, and keep the head low if the face is pale. More than this you will not be able to do, except to send for a doctor.

Sun Stroke

The condition of a person overcome by the heat of the sun will be stertorous breathing, quick pulse, skin hot and dry, face sometimes flushed, and a condition of coma or unconsciousness. Remove the patient to a shady spot; strip him to the waist, apply cold water freely to his forehead, the top and back of his head, the neck, spine, and wrists. Fan him vigorously. When he is conscious, give him a little cold water, nothing alcoholic. A good preventive of sun-stroke is to sew red flannel or put leaves in the crown of the cap. Place a handkerchief in the back of the cap to hang down protecting the neck. Face the sun. Never stand with your back to it if you can help it. Be very sparing in your use of drinking water. Gargle your throat and wash out your mouth but do not drink except in very small quantities when exposed to the heat.

Frostbite

Apply soft snow or cold water to parts effected, using friction by rubbing with the hand. Do not remove the patient to a warm atmosphere until circulation has been restored. To prevent frostbite apply grease freely to the part exposed.

Epileptic Fits

The condition of the patient is as follows: He will fall to the ground, foam at mouth, clench his teeth and fists, have convulsive movements of the head and limbs, and breath heavily. Treat as follows: Force the jaw open and place some hard substance in it, such as a piece of wood or the handle of a pocket knife, to keep him from biting his tongue. See that his teeth are in place as a danger exists of pushing a false set down the throat. Loosen his clothing, raise his head and shoulders slightly, and keep head still, but do not forcibly restrain the

convulsive movements of the arms and legs; if you do, you are apt to tear the muscles. *Prevent him from hurting himself.*

Fan him vigorously and give him water or tea to drink, *when he is conscious, but not before,* as you might choke an unconscious person by trying to force liquid down his throat. Do not give an alcoholic stimulant.

Fainting

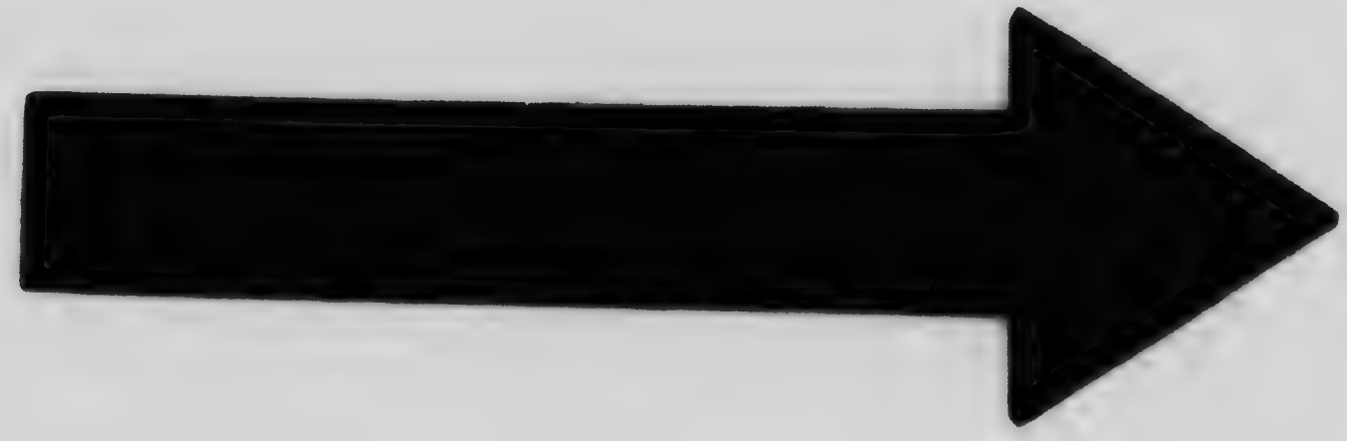
If a man feels faint, duck his head between his knees. It causes the blood to rush to his head, thus removing the cause and preventing, in most cases, the faint from taking place. If the faint has occurred place the patient in the coolest spot, ease his clothing and keep head low. Place a cold water handkerchief on forehead. Sprinkle face lightly with cold water, and make him lie down for fifteen minutes.

Choking

Choking needs prompt treatment, as generally there is no time to fetch a doctor. Try and hook up the obstruction with your fingers. If you cannot do this, bend the patient forward, at the same time thumping him hard between the shoulders. Should that fail, stand him on his head and continue to beat him with the flat of your hand. Should non-success attend your efforts and the patient by this time is black and blue in the face, apply artificial respiration without delay.

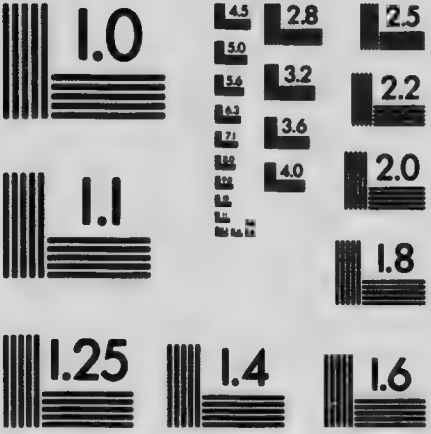
Clothing on Fire

If a man's clothing gets on fire, get him on the ground; if he runs, trip him or knock him down. Flames always rise. If the front of his clothing is burning, lay him on his back, and vice versa. Then smother the flames with coat or blankets.



MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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Burns or Scalds

Burns and scalds are very serious, not only because of the injury locally, but because of the very great shock to the system, often so severely that the patient cannot successfully fight it. Treat as follows: Cut off clothing, leaving on any part of it that might be stuck to the body. Apply boracic ointment freely if available, if not, saturate the parts affected with any animal or vegetable oil such as olive or sweet oil or carron oil; failing that, anything greasy, such as butter, lard, vaseline, soap, or flour, either dry or made into a paste. Hot water can also be used with success. Cover the burnt parts with dressings in small strips, not in one large piece and use cotton wool freely. The air should be kept from the parts affected. If there are blisters do not prick them. Protect them with cotton wool, leaving the rest to a doctor, as there would be a grave danger of blood-poisoning setting in if they were pricked in an unskillful manner and without the necessary equipment.

Scalded Throat

Treat a scalded throat as follows: Give a soothing drink such as olive oil. then cold water and place a cloth wrung out in very hot water around and well covering the front of the neck.

Bleeding Nose

For nose bleeding the method of treatment that is usually effective in arresting the flow is as follows: have the patient lie down, or sit with the head well back where there is an abundance of fresh air. Get him to open his mouth wide, and to breathe through it, instead of through his nose. Apply handkerchiefs wrung out in cold water, and place one across the bridge of the nose and another at the back of the neck. Get the patient to clasp his hands above his

head. If possible, place his feet in hot water. Ease his clothing, and fan him. You can also press the finger and thumb each side of the root of the nose. The bleeding is frequently beneficial as it may prevent something more serious and thus is really a kind of safety-valve. The nose should not be plugged unless, after a reasonable test, the foregoing treatment fails.

Animal Bite

If bitten by dog or cat or other animal proceed as follows: At once apply a ligature, that is, a piece of string or a handkerchief tied tightly close to and on the heart side of the wound, at the same time encouraging it to bleed freely. This is to prevent the blood passing to and from the wound, as it might be poisoned. Iodine or several heads of matches placed on the wound, and then fired, will cauterize it. Protect the part with a dressing and get medical attention as soon as possible.

Snake Bite

In case of poisonous snake bite, quick, careful treatment is necessary, so keep your senses; tie a bandage tightly around the limb between the wound and the heart; encourage bleeding, by sucking if necessary, and if possible send for a doctor; scratch around and rub in powdered permanganate of potash. If circulation is cut off for more than an hour, mortification may set in, so it is necessary to loosen the bandage every thirty minutes. Whiskey can be used freely, but in small doses. It is valuable as a stimulant and combats the paralyzing action of the poison.

Electric Shock

Should you find a man in contact with a live wire, insulate yourself in the best and quickest manner possible by standing on dry clothing, wood

or paper. If you have dry rubbers on, you are immune from the shock. After making yourself safe by insulation take a stout stick for a club and strike the wire smartly, knocking it away from the patient. If this is not practicable secure a piece of rope, take an end in each hand, throw the loop over his shoulders and give a quick pull towards you. Sometimes a "flying kick," meaning both feet off the ground together, will have the effect desired. If the patient is unconscious, apply artificial respiration immediately.

Foreign Bodies in Eye, Ear, Nose or Stomach

If the dirt is in the upper part of the eye you may brush the part with the lower lashes, or you may roll the upper lid over a match and wipe out eye with a moistened corner of a handkerchief. Never rub the affected eye. For the lower part of the eye, pull out the lid and wipe the eye as already directed. A foreign body in the ear should be let alone, as any attempt at treatment on your part may be disastrous. It is not urgent; let him see a doctor. Should it be an insect that has crawled into the ear, a little oil dropped in, or, failing that, water will sometimes float the insect out. A foreign body in the nose can, as a rule, be removed by causing the patient to sneeze, giving him a little snuff or pepper for that purpose. A foreign body in the stomach may be treated by feeding the patient lots of pudding, soaked bread, or porridge. This will have a tendency to form a coating over the object and prevent internal injury. Do not give a purgative.

Artificial Respiration

Every person should know the principles of, and be able to perform, artificial respiration, as its need for use is fairly frequent and may occur at any time. It may be needed in cases of gassing,

suffocation, apparent drowning, electric shock, and many other causes. Time is of the utmost importance. Do not waste any by attending to secondary matters, not even loosening the clothes, wiping out the mouth, or bothering with the tongue. That may be attended to later by a comrade.

Proceed at once to perform over the patient the following very simple movements. Very promptly lay him on his stomach, with his arms outstretched beyond his head. Place the head on one side then straddle patient. Next place the flat of your hands squarely on the lower ribs, just where you can feel the "spring." Spread your hands, the fingers pointing to the ground, thumbs closed, your wrist joints being quite flexible. See that you are kneeling well up in line with the patient's hips.

Next proceed to swing your body forward, keeping your arms stiff and not bending the elbows. As you swing forward, count in this manner, one and two and three, then come back with a jerk counting one and two, relaxing your pressure but keeping your hands in position. Do this until the doctor arrives.

Do not despair; success has been attained even after three hours of such work. The counting as above will mean that the movements will be executed about 12 or 15 times a minute. Understand that when your body presses over him let your weight do the work. You are pressing the air out of the lungs, and when you relax suddenly fresh air is sucked in by the mouth and nostrils, which by the face being on one side are free from obstruction. When natural breathing has commenced, get helpers to rub the limbs to encourage the circulation of the blood. Do not permit rubbing until then. Smelling salts applied to the nose, and beating the heels of the patient are also helpful.

Rupture or Hernia

This is very serious, and no attempt should be made by you to treat the patient other than to rest him comfortably with a cushion under his knees and to apply cold water dressings to the affected part. This complaint sometimes comes on suddenly, bringing with it great pain, swelling and sickness.

Sprains and Strains

Briefly, a sprain involves a joint, and a strain a muscle. Cold water, with a bandage around the part for support, is sufficient for a sprained joint, such as the wrist or ankle unless in the case of the latter you are on a hike. In that event do not remove the boot, but pass the centre of a bandage under the waist of the foot, crossing the instep and winding around the ankle, applying it good and snug. If the temperature of the weather permits, saturate the foot in cold water, both for relief and to shrink the bandage to give more support. In case of strains involving the muscles, treat as follows: Expose the affected part and apply cloths steeped in hot water, as hot as it is possible to bear. Test the heat with the point of your elbow. Do not let the cloths cool off even slightly; keep changing them. Do this for ten minutes then change suddenly to cold cloths. By this time the pain will have been relieved. Place bandages of some kind over the part in order to avoid chill. If this treatment is not possible, just rest the patient in the easiest way you can and cover him up warmly.

Poisoning

One never knows when an accident of this nature may occur, either in the home or camping out. Observe whether the patient's mouth or lips are stained or burned. If so, do not attempt to make

him vomit. On the other hand, if the mouth and lips are not stained, administer an emetic to make him vomit as quickly as possible. For carbolic acid poisoning give alcohol with half water, or any kind of spirit such as whiskey, failing that, a stiff dose of Epsom salts in milk will neutralize the poison. Then give olive oil or a similar oil, and either strong tea, coffee, or white of eggs. In phosphorous poisoning (rat poisoning) do not give oil. This treatment, excepting alcohol and Epsom Salts, is good for any poison where the mouth is stained or burned. In ptomaine poisoning the patient, or patients, will complain of pains in the head or stomach, or both and may have acute diarrhoea and sickness, possibly at the meal or shortly afterwards. Promptly make all who have eaten the food vomit whether they show signs of poisoning or not. This can be done with salt and water, mustard and water, or soapy water, or by putting the finger down the throat. Get the doctor as quickly as possible. Prevent others partaking of the food suspected, but keep it for examination.

Morphine is very largely used to-day and the misuse of it may cause poisoning. In this case the pupils of the eyes become very small. Should the patient be conscious, give him an emetic, that is, make him sick if you can, using mustard and water for the purpose. Keep him awake by hustling him around, a man supporting him on each side. Flick him in the face with a wet towel and apply strong smelling salts to his nose. Do this for about half an hour; then encourage him to sleep, but watch him in case he should fail to breathe. Should that be the case, apply artificial respiration.

Cramps

Cramps are not uncommon either during or after a long walk or on a very hot day when exposed to the heat of the sun. One is apt to have cramps by

drinking water to excess. In the first the legs will be affected, in the second the stomach. For cramps in the leg, tie a piece of string or handkerchief very tightly over the part. This will usually give instant relief. Cramps in the stomach can be relieved temporarily by pressing the flats of the hands firmly right where the pain is felt, and then giving the patient a hot drink, such as tea, coffee or bovril. The application of hot flannels will also give relief.

Transportation of the Injured

Stretchers are sometimes necessary for the removal of the sick and injured but they are not always at hand. Take three coats and turn the sleeves inside out; then button up the regular way. Next take two broom sticks and pass them through the sleeves, which are inside the coats. The buttons of the coats should be on the underside; the backs of the coats forming the bed of the stretcher. Spread them evenly the full length of the poles. Lay an overcoat on the top for greater strength. Test the strength of it before using. A suitable stretcher for a sitting case can be made with two poles, one coat prepared as the three coat stretcher. An extra coat can be placed across the top for added strength, the patient resting his back against the bearer. A sitting case can also be assisted by two bearers holding a pole in front of them, the patient sitting in the centre, his arms around the necks of the bearers.

Hand Seats

A knowledge of how to make hand seats is also very useful, and a little practice will make the "First Aider" efficient. To make a two-handed seat, required by an unconscious man, two bearers will face each other, dove-tail the right and left hands for a seat, placing the remaining hands on each other's hips or shoulders, according to the height of the patient. A three-handed seat used to carry a patient

with an injured lower limb, is made by one bearer clasping his forearm, at the same time the first bearer grasps his, thus locking the three hands firmly, and backs of the hands being uppermost. The second bearer's free hand is used to support the injured limb, the patient's arms being around the necks of the bearers. A four-handed seat is more comfortable, and is easily made by each man grasping his own left wrist, then locking hands, the patient placing his arms around their necks.

Fireman's Lift

When you are alone, and you have the responsibility of carrying a patient you have a variety of methods from which you can choose, making your selection in some cases according to his injury. It is well to become proficient in them all. The fireman's lift takes precedence of all of these on account of the great distance a man can be carried, even though his weight may be considerably more than that of the bearer. In addition, a man can be lifted from the ground with comparative ease without the slightest strain.

Proceed as follows: Turn the patient on his stomach, placing his arms to his sides. Stoop; put your hands under his arm-pits and draw or push him up to his knees. Embrace him quickly around the waist, and stand erect, he is now on his feet. Quickly grasp his right wrist with your left hand, stoop, pushing your right arm between his legs, your neck against his thigh, at the same time putting his arm over your head. The patient in the meantime has fallen over your shoulders. Rise to the standing position and change his wrist from your left to your right hand.

The key to the successful use of this lift is in getting your neck snug to his thigh; there is then no pulling on the shoulder. Should the patient

be in such a condition that he cannot be kept up for the brief period necessary, his knees giving way beneath him, commence by kneeling in front of him and raising him to his knees as described; then bend

Position 1 *Position 2* *Position 3*

FIREMAN'S LIFT

your body passing your right arm between his legs, allowing him to fall over your back as before described. By thus getting under him you can with care rise to your feet and move off, grasping his wrist as before.

The baby lift is very simple and effective for short distances. Let the patient put his arms around your neck, you placing one arm across his back, and the

Position 4 *Position 5* *Complete*

FIREMAN'S LIFT

other under his knees, throwing his weight as much as possible on your chest.

The pick-a-back lift needs no description. To make it as easy as possible for the bearer, the patient

THE BABY LIFT

THE PICK-A-BACK LIFT

must let his weight hang well forward. If his arms are hanging down, it will make the lifting easier.

The fore-and-aft lift is a good one for two bearers and is also very simple. One bearer places himself behind the patient and clasps him under the arm-pits across the chest. The other opens his legs and stands between, his back to the patient, and stooping, grasps his legs at the knees. The front bearer steps off with the left foot and the rear bearer with the right.

CHAPTER X

CAMPCRAFT

Campcraft

By Jas. Edmund Jones, B.A.
President Aura Lee Boys' Club, Toronto

CANADA is a wonderful country for the camper. Think of Belgium, 11,373 square miles with 557 inhabitants to the square mile, and England, 50,823 square miles, with 535, and then remember that Canada has in its 3,119,919 square miles only 3 inhabitants to the square mile! You then have some idea of your freedom to roam almost free from

those annoying "...o trespass" signs that Jerome K. Jerome speaks of so amusingly in his "Three Men in a Boat" (a good book to read aloud in camp) and you get some idea also of the freedom of the wild things to exist and multiply, less exposed to the effect of the ordinary man's desire to go out and kill something.

"SEE CANADA FIRST"

Some day if you travel overseas you may be ashamed of the admissions of ignorance you may have to make as to the lakes and waterways of your own country. In the Great War our soldiers distinguished themselves by their power of initiative in planning trench raids and other new methods of warfare. In peace times let us show the same spirit in planning new travel routes, new simple camp comforts and conveniences, and all those things that induce and accompany a real spirit of adventure. In God's open air at all times there is more time for thought, for communion, for observation, for all those things that help to make life worth while. "Is life worth living?" As was said long ago, "That depends upon the liver." So whether we think of our intellectual, physical or moral life and health, nothing can be better than a holiday in the open spaces.

But one need not travel far to pitch camp. A resourceful chap may do with even a backyard. The great thing is to depend as much upon yourself as possible. If you are going to camp where it is not easy to replenish your supplies the following list of food, etc., for six men for two weeks will be useful: 18 lbs. bacon, 2 lbs. cooked ham, 1 lb. spiced beef, 4 lbs. bologna, 60 lbs. bread, 6 lbs. white beans, 6 lbs. rice, 24 lbs. granulated sugar,, 20 tins condensed milk,

(or powdered milk) 6 lbs. flour, 4 lbs raisins, 4 lbs. rolled oats, 4 lbs. cornmeal, 4 lbs. wheatlets, 7 lbs. prunes or dried apricots, 1 doz. short candles, 6 tins salmon, 2 tins sardines, 1 pkg. corn starch, coffee, tea, currants, 4 lbs. sago, 3 tins corned beef, 4 lbs. biscuits, soups squares, egg powder, etc.

Clothes

Do not take lined tweed or other things that do not dry quickly. Wool is best and is really cooler. A dunnage bag containing over 30 lbs. is heavy, so leave everything at home that is not really necessary. Vests are unnecessary in summer. "Spares" of some articles of clothing need not be provided for each member of a party on a short trip, as the "spares" may be shared in emergencies. Sweaters and rain-coats are more than a comfort, the latter especially. If a member of a party has no rain-coat he is liable to shirk his share of discomfort and work in rainy weather. In the Trail Rangers' Manual will be found some pointers as to equipment which need not be repeated here.

Music

Mouth organs may be easily learned and a camp orchestra quickly trained. Be sure that the organs are in the same key. Guard them carefully from wet and dirt. In a still camp a portable reed organ is the thing.

Don't Hurry

Remember that Whittier probably meant us when he wrote:

"Dear Lord and Father of mankind,
Forgive our feverish ways.

. . . . .

Take from our lives the strain and stress,
And let our ordered lives confess,
The beauty of Thy peace."

Don't sacrifice enjoyment to speed. A good huckleberry patch is more than an excuse for dropping one's load; it is a command. Some are in too great a hurry to notice the difference between the blueberry on the small bush and the dark huckleberry on the larger bush. They don't even know the difference between poison-ivy and Virginia creeper, and between the Amanita (the most common poisonous mushroom) and a puffball, coral or other edible mushroom.

Photographs

Give the photographer lots of time. Don't take too many cameras. An illustrated diary is the best. If you have a cartoonist with you, keep him busy.

Reading Aloud

This is far more enjoyable than for each member to read his own book. Some persons when they get interested in a book read it to the exclusion of everything else and it is impossible to get them to do their fair share of the camp work. There is far less fun, far less good-natured bantering in camp if, at every spare moment, each member buries himself in his favorite book. A book read aloud furnishes camp jokes and sayings, provokes many a general laugh, arouses literary and other discussions, and adds to the interests which the campers have in common. The correct pronunciation of words is discussed and it is often discovered that words uncommon in conversation, but used commonly in books, have never been learned to be properly pronounced by readers or hearers, merely because of want of courage to use them in conversation. Take a book of songs.* A book of adventure like "White Fire" by John Oxenham is a good kind of book to read aloud.

*Such as Columbia Collection, 120 songs (25c.), Walter Jacobs, Boston, Mass.; Camp-Fire Choruses, 225 songs and hymns (15c.), Oxford University Press, Toronto; 55 Community Songs (10c.), C. C. Birchard & Co., Boston, Mass.

Reveille!

Edible Wild Things

Learn what may be eaten in emergencies. A porcupine is one of the few animals that may be killed without a fire-arm. Never kill one needlessly. Some day a lost man may be spared from starvation, for the meat though coarser and greasier than bear's meat, is edible. Frogs' legs and turtles, roasted acorns, roots of jack-in-the-pulpit (Indian turnip) Indian cucumber, flags, dandelion, milkweed, may-apples (mandrake) wild onion, arrow-leaf (the root) and most fungi are edible. Bane-berries (both the white and the purple) are poisonous. This is a large subject, but in a camp you may start the study.

The early-morning visitor to the Camp Larder

Firearms

In summer weather a gun is not merely useless, but a nuisance. No one with a proper regard for the laws of his country or with a proper consideration for the helpless young should shoot duck, partridge or other birds when their young are dependent upon them. As for a revolver, leave it at home. It only kills man. In summer weather there is no danger from wild beasts. Shoot with a camera, and make lantern slides worth having.

"See how from the brink flees the deer lightly
up-springing.
Back from the deep woods now out light
laughter is ringing,
Hark, how the soft echo from hill to hill is
winging,
Over the glint and the gleam of the waters,
and far away.
Fast and far, fast and far.
Swift and deep stroke of the paddle is sending us,
Fast and far, fast and far,
Over the glint and the gleam and far away."*

*Univ. of Toronto Song Book, page 194.

Arguing May be Overdone

Swift repartee and sharp argument must never be indulged in so as to offend or hurt a fellow camper. In religious matters especially remember that all denominations are getting together in a way our forefathers never dreamed of. Let us find what common ground we occupy.

"Oh Lord and Master of us all!
Whate'ver our name or sign,
We own Thy sway, we hear Thy call,
We test our lives by Thine."

The last line of this stanza of Whittier's reminds us of the four-fold development on which our C.S.E.T Program is founded.

Keep Busy

Energy and alertness should not be one-sided. Keep your mind busy as well as your body.

"Who yearns for palmy southern seas?
Who longs to dream the langorous hours,
To fritter in luxurious ease,
His vigorous manhood's early powers?
To the North! To the North we go!
To the North, where the fresh winds blow."*

Develop a Camp Poet or Two

The lines just quoted are from a fine song (Univ. of Toronto Song Book, p. 162) written by an Aura Lee Club member, produced under a rule requiring at least one new song each trip. If you catch the real spirit of outdoor life you can do likewise.

Have a few Rules and Keep Them

For instance, no throwing things about. It's only sheer laziness not to take an extra step to get what one wants or hand it to a comrade. How many cups, pieces of soap, and other valuables have been lost in water or broken on land by the fatal, lazy

*University of Toronto Song Book, page 162.

habit of pitching. Don't pitch fish cans, refuse, etc., where they will offend those that come after. Good camping grounds are scarce.

Make an inventory of all camp belongings and check it occasionally, certainly every time you move. Paint pegs white and keep them in a bag when not in use. Keep matches in several dry spots.

Elect a Chief

Obey his order in even the smallest thing. It saves all sorts of useless discussions and perhaps some ill-feeling. Let him divide the work fairly among cooking, house-maid, water, wood "gangs," etc.

Come Home Knowing More

Endless opportunities occur for learning things. Can you distinguish a pike, muskelonge, perch, pickerel, bass, salmon trout, gray trout, brook trout, sucker, catfish, etc.? Can you place a sample of hemlock with its flat clusters of needles beside the fragrant balsam and show how the balsam differs from the stiffer spruce? Can you lay the boughs shingle wise, so that the thicker portions are hidden by the softer and give that springiness that produces comfort?

CAMP COOKING

Just a Few Hints—Not a Cook Book

Variety is not only good but makes meals more interesting. Don't let fare become monotonous.

COCOA—is the best drink, especially on cold nights. Heat just enough water, measuring with a cup. Add condensed milk—half a one-pound can for six persons. Mix teaspoon of cocoa for each person in a little water or milk. Add this to the pot when milk is boiling. Leave on for a few seconds.

TEA—If you must have tea, use black, *not green*. Do not boil it. Throw tea into boiling water and at once take if off the fire, and let steep for five minutes. Mix milk in the pot; it is more economical and convenient. A teaspoon or less of tea for two persons. Don't waste.

COFFEE—Into boiling water, put one teaspoonful for each person and boil ten to fifteen minutes. Put milk in and bring again to boil.

SOUP—Carried easily in compressed squares. It will stand much more water than directions state. Have it at least once a day.

WATER—Left in a pail over-night is cooler in the morning than if taken from the lake. If pail be not of wood and is swathed around with wet cloths, whether by night or day, the evaporation reduces the temperature. Butter left in water keeps hard.

PORRIDGE—Take several kinds. Rolled Oats are liable to heat the blood in summertime. Don't make cornmeal too thin. Two heaping tablespoons for each person. Boil twenty minutes. Don't forget salt; a small teaspoonful for six persons. Don't leave stirring spoon in the pot; it gets too hot. Have a strong, long spoón; wooden one is good. When the porridge is served, fill pot at once with hot or cold water, to make the cleaning easy.

BACON—In camp, one can eat with relish much fatter bacon than at home. Keep all unused fat for "dripping." Keep in tin with screw-top and use for pancakes, buns, fish, etc. Heat pan before putting bacon on. Don't fry too fast. Put bacon on bread, not on plate, and thus save washing. Lumberman's pork must be parboiled, *i.e.*, the brine must be stewed out in water first.

BEANS—Soak over-night. Better give them a preliminary boil the night before. Throw in some bacon, pepper and salt. Give a finishing touch in the frying pan.

POTATOES—Are heavy to carry, therefore, take evaporated. Put salt in while boiling. When soft, pour water off, put pot back on the fire for a minute or so, shaking it vigorously to keep potatoes from burning. Boil at night and fry in the morning in bacon or with shortening of some kind.

RICE—Put in a little water and add water as rice thickens. Keep stirring until soft. Add less than teaspoon of salt for six persons. When nearly cooked, add condensed milk, currants or raisins. Add some flavoring, such as vanilla.

SAGO—Obtained from interior of trunk of various palm trees. Cooks very quickly. Add condensed milk and cooked evaporated apples, apricots, pears or peaches.

PRUNES—Get good ones and eat often. "KYBO."

EGGS—Boil three or four minutes completely covered. If one cracked, add salt to water and smear salt on crack. If an egg floats reject it. Egg powder is easily obtained which

is great for fritters, pancakes and all kinds of cooking. Poach eggs in salted water not too hot, as boiling water will break up an egg. Place on toast or on a *hot* plate.

SCRAMBLED EGGS—Break eggs and beat well together. Add teaspoon of milk for each egg and a very little salt. Grease frying pan, pour in eggs, stirring carefully till they thicken. Take off when still somewhat soft.

A good method of building a camp fire

OMELET—Beat whites and yolks separately. Add salt with pepper and some milk. Grease frying pan, heat it. Mix whites and yolks. As the mixture cooks, roll it, first pouring over the surface some chopped bacon, onion, tomato or something else.

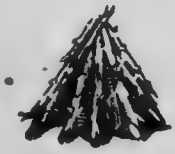
SUGAR—Take white. Brown gets damp too easily.

FISH—Boil in thin muslin or cheese-cloth. Salt the water well or fish will not hold together. Put fish in just before water boils. If convenient, add 3 tablespoons of vinegar for a large fish. Boil six minutes for each pound of fish.

DRAWN BUTTER SAUCE—For boiled fish, etc. Put one tablespoon of butter and one of flour into a saucepan. Add one pint of boiling water, stir until boiling. Add half teaspoonful of salt, another tablespoon of butter. Mix well. Add little pepper and if possible, juice of half a lemon.

FRIED FISH—Fairly thin slices cook most easily. Sprinkle salt and pepper. Then dip in cornmeal or flour. Fry in greasy pan.

Round the Camp Fire



Pyramidal Camp Fire

Incorrect

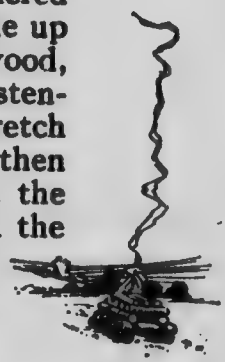
Do not build a pyramidal fire like the one shown. It wastes fuel and energy. You are apt to pile up all the available wood at one time, produce too hot a fire, perhaps a dangerous one. In a very short time it collapses and is difficult to rebuild. Build a four-square fire serviceable and emblematic of our Program as follows:

Place one longer logs underneath and build a small fire that can be replenished. Get a good stock of

wood before dark, enough to last all evening. Let each member come to camp prepared to contribute to the evening's entertainment. During the year let him record in a note book the words of recitations and songs that he has learned. Have a book or two suitable for reading aloud and let each member, no matter how poor a reader he is, take his turn with a chapter.

To Mount a Fish*

Take a sharp knife and, commencing at the head, cut down through it, severing it in half. Continue the cut along the back, through the skin only, to the tail and forward beneath to the head again. Keep the dorsal fin and tail on the side to be saved. Remove the skin by peeling with a dull knife, then place it on a board with the inside up and scrape away all particles of flesh. Clean out the head and remove gills and eye. Wipe dry and rub powdered arsenic on the inside of skin. Place it right side up on the mounting board (the lighter the color of wood, the better) and stretch it to the correct shape, fastening it with little tacks or pins. Take care to stretch the fins also. Allow a day or so for it to dry, then give two coats of varnish, doing the board at the same time. Tack or nail a strip of birch around the board for a frame. A little padding of paper under the skin, to round it out, sometimes improves the appearance.



The Four-square fire
A good one

Let us conclude this short sketch of some camp lore and activities by a quotation from a "camp log" written by John D. Spence, of Toronto:

"Stronger, heartier and more hopeful we go now about our daily work by reason of the brief, bright experiences of a very pleasant trip. Hard work in plenty, plenty of opportunity for self-denial, spurs

*I am indebted to Mr. Graham Bertram for the recipe. A number of splendid specimens were mounted by us at Algonquin Park in the summer of 1918.

for the lazy and curbs for the over-eager, hot sun and chilling rain, straining paddle and wearying portage—all these the Camp of 1897, like all other such outings, undoubtedly supplied, but it gave us other things—better things—than these. Manlier heart and tougher muscle, the glory of the sunset and freshness of the dawn, the moonlit stillness of the lake and the sweep of the river as it flashed and gurgled among the stones, the solitude of those forest fastnesses and the comradeship of friends whom here we learn to know as nowhere else—these are our rewards. A brief return to the crudeness of nature; a brief renunciation of the artificiality of business and social life; a brief enjoyment of skies and lakes and rocks and pine trees at their freshest and best. Then, with firmer grip and steadier purpose, back to the work or the waiting, back to the rush and the bustle of the city, to brush shoulders with our fellows in whom we approve the good and censure the selfishness with the greater charity because we have been ourselves brought nearer to the trust and truthfulness of our childhood."

Canoe Trips

By James Edmund Jones, B.A.
President of Aura Lee Boys' Club, Toronto.

Beneath the vast illimitable spaces
Where God has set His jewels in array,
A man may pitch his tent in desert places
Yet know that heaven is not so far away.

But in the city—in the lighted city,
Where gilded spires point upward towards the sky,
And fluttering rags and hunger ask for pity,
Grey Loneliness in cloth-of-gold goes by.

—Virna Sheard.

What to Take

Canoes

DON'T take a small one. A sixteen-foot is best, both for safety and comfort. A painter of strong fine rope and fairly long should be attached at each end. It is wonderful to see what tiny streams even a heavily laden canoe can navigate. Arthur Guiterman in his beautiful song writes:

"Up through the fields where the cattle browse,
Up through the farms of rye,
Under the arching hemlock boughs,
Under the laughing sky,
Out through the maze where the muskrats hide,
Drawn like a silver clew,
Clear to the buttressed mountain-side,
Goes the trail of my little canoe."*

Some day you may have the glorious experience of climbing Maple Mountain, above Lady Evelyn Lake, Temagami, up the River Namabinnagasheshingue. In the joy of your youth and vigor you will revel not only in the beauties of that tiny trail, but will even glory in the portages, more than a score, which take you from stretch to stretch, past falls and ledges varying from one foot to over one hundred feet in height, your camera ever busy to record the succession of scenes of unforgettable beauty.

Canoe Mending

Sometime or other, no matter how careful you are, you may have an accident and a gaping hole caused by a jagged rock or an unfortunate stumble while portaging will call for resourcefulness. Press the cracked or broken wood back into its place and paint upon it a thin layer of marine glue. Heat one end of a piece of metal (*e.g.*, the detachable frying-pan handle) and press it upon the glue

*Univ. of Toronto Song Book, p. 182

which flows into the cracks and hardens. Do this both outside and inside. Take some tacks and small bits of tin with you in case of more serious damage. Electric tape may serve as a temporary patch.

Paddles

Start off with a paddle that suits you in length and weight. Otherwise it will be a continual annoyance and weariness. It must be strong enough to bear the weight of the canoe on the portage and for pushing up-stream in shallow places. The stern paddle should be longer than the bow paddle. Double paddles are not suitable for a cruise. The Canadian Indian poetess, Pauline Johnson, who well knew the intimate charm of the paddle as well as of the canoe, wrote a great poem "The Song my Paddle Sings"

"Be strong, O paddle, be brave, canoe,
The reckless waves you must plunge into,
Reel, reel, on your trembling keel,
But never a fear my craft will feel."*

Sail

Don't take a sail on a cruise by river and small lakes. It is a nuisance to carry, is always in the way, and seems to invite the wind to blow against you. A resourceful camper can improvise a sail out of a raincoat, a rubber sheet, or a leafy branch. What thrills can be produced by a race down a stretch of river, or over a small lake in such sailing craft is known only to the camper of simple tastes.

When you are on the lee side of a lake do not start across it if the wind is blowing strongly, unless you are quite certain that the far side of the lake is not dangerously rough.

Every experienced camper will tell you that it

*Univ. of Toronto Song Book, p. 213

is easier for one man than for two to carry a canoe any distance of say more than 40 yards. Do not attempt to carry a canoe right side up with all sorts of camp miscellany in it. You will find that the weight is a severe strain. If two men each take one end of a canoe on the shoulder, the jolting caused by the impossibility of keeping step and the strain of holding one's hand and arm up to balance the canoe on the shoulder soon make the portage a wearisome task. Moreover, the second man may be much more profitably employed in carrying over some of the load, thus saving time and strength.

How to Save One Mile in Three

If the party has more dunnage than can be carried on one trip and less than on two, time may be saved and the work more evenly apportioned by the following plan: Let one man carry the canoe, say, 1,000 paces, and his companion half the dunnage 500 paces. Then let the latter return for the remainder of the load and by the time he has brought it forward 500 paces the canoe-man has returned 500 paces and they carry all the load up to where the canoe is. If the portage is long, this plan may be repeated several times on the one portage, with the result that one man will be saved one mile in three and the portage will be accomplished that much quicker. Test this with three articles on a supposititious portage on a table.

Manner of Portaging Canoe

Take good cord and tie it so as to make loopholes upon the top of the middle and forward "thwarts," as the seats of a canoe are called. Then into the loops in-

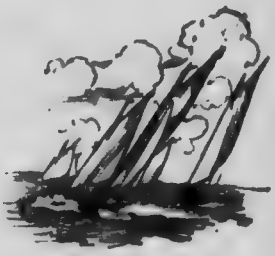
sert the paddles, which are thus prevented from slipping when the load is on the shoulders. Insert the paddles with the handles towards the bow. The paddles thus serve as rests on which the canoe is carried bottom side up.

A well-grown boy of 16 can lift the canoe from the ground and place it over his head if, by standing at one side, facing the stern, he draws the canoe up on one edge, bottom towards him, and grasps the canoe with one hand on each gunwale just in front of the forward thwart. Then bend the knee next the canoe slightly and roll the canoe over until one edge rests on the thigh, the canoe facing the body. Then by giving a hoist with the knee he may with little difficulty lift the canoe over his head and will find that he is facing in the right direction to start on the portage.

The canoist, now the portager, stands almost in the centre with the bow of the canoe slightly elevated so that he an see where he is going. The upper parts of the blades of the paddle rest on each shoulder close to the neck, the loops on the middle thwart being so adjusted that, if desired, the paddle, can be spread and drawn closer together again upon inserting the head in the yoke. Small holes bored through the thwarts will not weaken them, and may serve to keep the cord in place. On the bow thwarts straps may be used (ordinary skate straps) as they can be easily adjusted, if sufficient holes are punched in them.

The blades of the paddle grinding upon unprotected shoulders, would become intolerable. Over twenty-five years ago I invented a portaging cushion to avoid this discomfort. This cushion covered

with leather or carriage cloth is well padded, and fastens round the neck with a strap, horse-collar fashion. Sporting goods houses now sell pneumatic cushions for this purpose, but the load does not ride as steadily upon them and they are liable to become punctured. If one's cap is padded on top, one may occasionally ease the shoulders by lifting the canoe on his head.



The Days' Program

Change partners every day or at least every second day. This breaks up cliques and is more satisfactory in every way. If one member of the party is very entertaining it is unfair for one other member to monopolize him. If one man turns out to be objectionable the entire party should share his company. The members of the party will not be equally strong paddlers and if two strong paddlers get together day after day it becomes discouraging to the others. Sometimes it is not easy to divide the load evenly. The grub bags get lighter and canoes may not be equally easy to paddle or to portage. It is not fair sometimes for the same load to be assigned to the same couple. Therefore, keep changing partners. Remember, too, that when paddling together for hours, day after day, even boon companions may run out of topics and when this happens some campers make a desperate attempt to keep up the conversation, not realising that there are times when a silent man is companionable.

Never get out of sight or hearing of your companions. Probably, when you are scampering along at breakneck pace, you are passing unnoticed some of the beauties and interesting things you are making the trip to see and, if so, you are making one of the biggest mistakes in life.

Keep Together—Don't Get Lost

At the beginning of the trip let the Mentor or leader give a talk on the dangers of getting lost. Sometimes the whole party must stop and two or three make a systematic search for the path. It is advisable for the searchers to break twigs and leave them hanging on trees all along their course, so that if they do not find the path they can easily find their way back to their companions.

If one camper gets lost he ought to stop at once as soon as he is aware of it, climb a tree on a hill, shout at regular intervals some danger signal that has been agreed upon, and not stir till he is found. While he is waiting for help, let him light two fires a little distance apart so that the smoke may perhaps be noticed. He should not waste his strength floundering in the untrodden wilderness for he will without doubt wander farther and farther away from his companions who otherwise would surely find him if he keeps up his calls and signals. They will be on their guard and will not get lost while they are looking for him and can each search in opposite directions. Do not forget that if blazes on trees are to be followed, one must make them on both sides so as to be visible when coming and going. Make sure that one blaze may be clearly seen from the next blaze. Never get frightened. As soon as you think you are lost sit down and deliberately study over the situation. If you should decide to try to find the path be sure to mark the way you take so that you can, if necessary, return to where you were and try again. Fear only destroys your judgment and tires your body. If your party seems hopelessly lost, follow down stream as the creek or river may bring you to larger waters.

Prevention is better than cure. Do not get separated. I remember once when I was piloting

some members of the Aura Lee Club through the woods, we seemed to have become hopelessly lost on a small lake. Two of the party broke a trail to a point a hundred yards from shore and then followed a course round the lake, keeping their canoe companions within call. At last they struck a well-marked trail and found that the last fifty yards of it next the lake had become thickly overgrown and hard to find from the lake-side. It is moments like these that test the resourcefulness and courage of the party and give a thrill to a real sport. When lost be very sparing in rationing your food.

Demi-Lunch

Before leaving home, make up a small lunch for each day to be eaten while en route at about 11 a.m. This makes a pleasant excuse for easing up for a few minutes and the party will be less faint for want of food at the regular lunch time. A little chocolate, some figs, dates, graham biscuits, raisins, a small portion of one or more of these things will suffice and you will be saved the time and trouble of rummaging in all sorts of bags to find what you want.

Canoe Seats

To travel for many hours kneeling becomes very uncomfortable. If the canoe is heavily laden one may safely sit on the thwart or on part of the load, but it is better to have an extra piece put in behind the thwart. A thin cushion on this will afford absolute comfort.

Waterproof Everything

There is nothing so miserable as wet clothing and wet food. These can be avoided, for you should take waterproof coats and waterproof bags. It is impossible to use wet bread, but dry bread

will be edible for two weeks if toasted. Take good crusty bread (currant loaf will not keep) and wrap each loaf with oiled paper. Then place it in a waterproof hamper that may be tumped on the back.

Tump Lines

Tump lines are made of leather about 16 feet long and three-quarters of an inch wide, but for one foot, nine inches in the middle they broaden to 2¼ inches where they pass across the forehead and over the back of the shoulders. Some men can carry 400 lbs. in this way, but 100 is a heavy load. A shoulder pack with a tump line also is really the easiest way to carry a heavy load. The things that are hard to pack, put in a hamper, which may be tumped above the shoulder tump.

Shooting a Rapid

Remember that frothy water with bubbles and air is less buoyant than quiet water. Never run a rapid without getting out first and looking it over to the very bottom. Do not run a rapid that you cannot see the end of. In running rapids and in emergencies the bow man may give directions and do some of the steering, but under ordinary circumstances a nagging, interfering bow man is an intolerable nuisance. One canoe should not start down a rapid till the one ahead is safely through. A canoe might get stuck and a collision in the middle of a rapid might be serious. Remember, a back eddy affords a canoe a place of safety if threatened with being carried over a fall. When going down stream, paddle in the middle; upstream, towards the sides out of the strongest current.

Camp Early

Avoid the discomfort of choosing a camp or making a meal in the dark. Camp near shade trees.

Where to Go

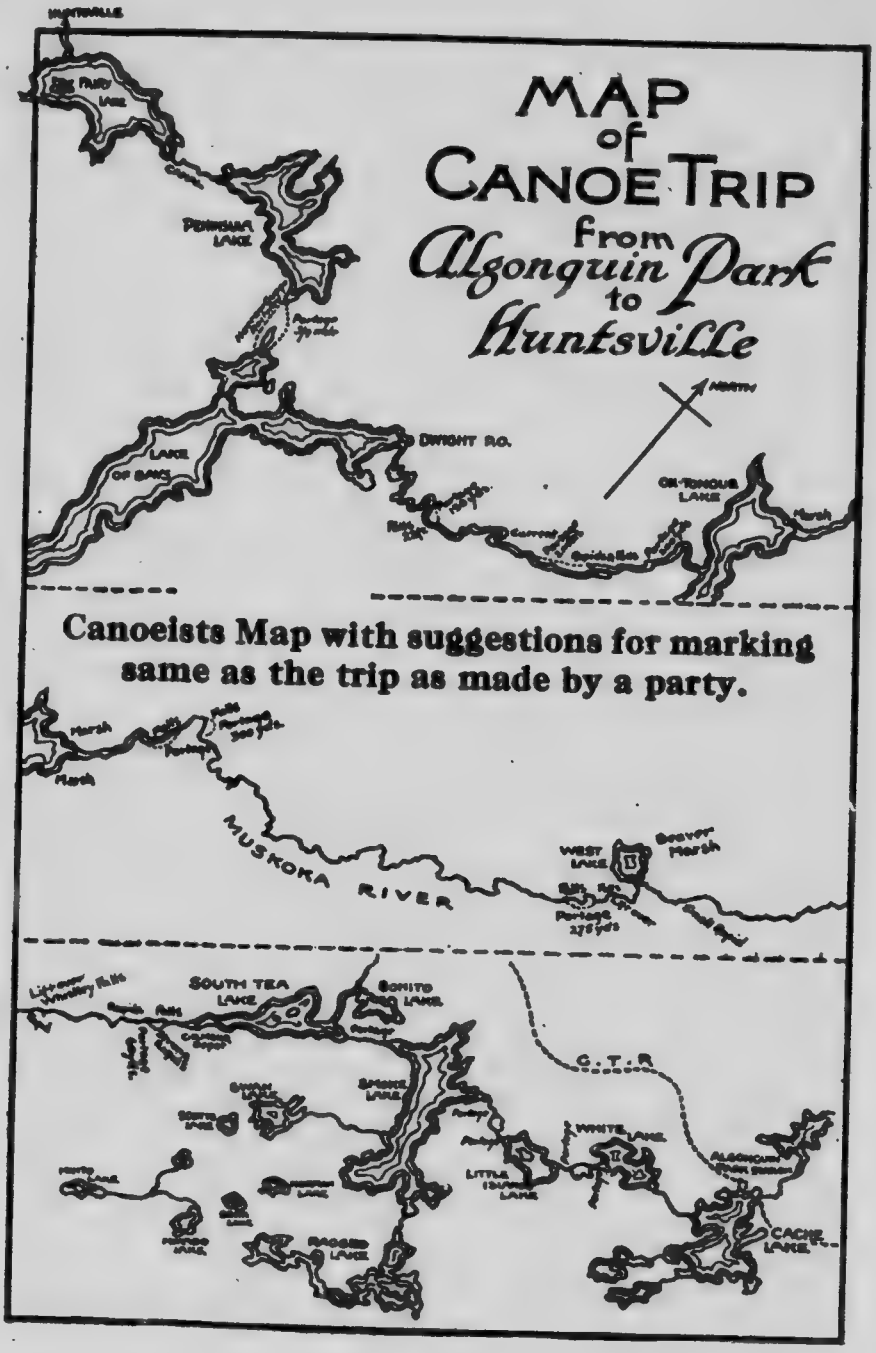
The most satisfactory thing to do is to discover a new route near home, as this reduces the principal expense of a canoe trip, the railway fares. Then go to the Government Survey Offices and, if you cannot purchase a copy of a township map, make a tracing on strong linen in Indian waterproof ink. The whole township need not be copied, but only the portion adjacent to the waterways.

Companions of Canoeists in Northern Waters

In copying the maps of rivers, the tracing may be more compact by dividing the sheet into two, and continuing the course of the river on the lower half. Try to keep the map about six inches wide as it is then more convenient to carry. Fold it so that it will open like a book and that only two pages need be exposed at one time. Bind in board covers. Have elastic bands to hold each side of the book in place. Take some tissue paper with you as you may want to make a rough extra copy for each day's route for one of the other canoes.

The joy of the trip may be extended through the winter months by planning the next year's route, the quantity and variety of supplies, and the many improvements in camp equipment. One winter our party thought out thirty-three new ideas in equipment.

Careful field notes should be made every day while traveling, so as to make it easy to direct others over the same route. Remember that you must often travel in reverse direction, so make your notes intelligible for that purpose. The accompanying



Canoeists Map with suggestions for marking same as the trip as made by a party.

map is a sample of careful marking of a course. In time at some central office a complete set of reference maps might be collected and corrected up to date. (Michie Co., Ltd., Toronto, has copies of all the writer's maps.)

Some Suggested Canoe Routes

1. Grand Falls to St. John, N.B., 200 miles
2. Up Madawaska and down Toledi River, N.B.
3. Woodstock to St. John, N.B.
4. Fredericton to St. John, N.B.
5. Fredericton to Maugerville via St. John River to French Lake via Portobello Stream, thence to Maquafil and Grand Lakes; then down Jemseg River and to St. John or go up Washedemoak Lake. Side trip up the Belleisle River, back through Kingston Creek, thence to Perry's Point on Kennebecasis River and to St. John, N.B.
6. Trips on (a) St. Croix River, (b) Miramichi, (c) Restigouche, N.B.
7. Many fine trips in the Adirondack Mts., (N.Y.), starting from Tupper Lakes.
8. Up the Lièvre and down the Gatineau River, P.Q.
9. Kingston, Ont., to Lake George, N.Y., via Lake of Thousand Islands, River St. Lawrence and Lake Champlain.
10. Ottawa to Kingston, via Rideau Chain of Lakes.
11. Through Kawartha Lakes, Ont., from Coboconk to Peterboro.
12. Down Mattawa River from North Bay to River Ottawa.
13. Down the Ottawa from Mattawa to Pembroke.

14. Fenelon Falls, Ont., north to Canoe Lake, Algonquin Park.
15. Canoe Lake to Huntsville, Ont., via Muskoka River.
16. South River to Canoe Lake via Rivers Amable Du Fond, Petawawa and Muskoka, Ont.
17. Mattawa to Head of Lake Temiscaming, via River Ottawa, Ont.
18. Little Current, Manitoulin Island, (Lake Huron) to Wahnapitae via Whitefish River, and through La Cloche Mountains, Ont.
19. Wahnapitae to Sturgeon Falls, via Lake Temagami, Ont.
20. Haileybury to mouth of Montreal River via Temagami, Ont.
21. Sturgeon Falls to Wahnapitae, via French and Wahnapitae Rivers, Ont.
22. Down the Moon River and through the Blackstone Lakes, Muskoka, Ont.
23. Down the Severn and up the Musquosh River, Ont.
24. Up South and down North Branch, Muskoka River, via Mary, Fairy, Peninsula Lakes, and Lake of Bays.
25. Through Metagami Reserve, from Biscotasing to Blind River, Ont.
26. To Lake Abitibi, via River Blanche, Ont.
27. Down Magnetewan River from Burk's Falls to Byng Inlet, Ont.
28. Kenora to Winnipeg, via Lake of the Woods, Winnipeg River, Lake Winnipeg, Red River.
29. Lake of the Woods; many trips about the thousands of Islands from Kenora, Ont.
30. Fort Qu'Appelle, down the Qu'Appelle River to the Assiniboine, Sask.

Building a Log Cabin

By Taylor Statten

National Boys' Work Secretary, National Council of Young Men's Christian Associations of Canada.

FOR real recreation what surpasses a holiday among the Canadian mountains, hills, lakes and rivers with an old fashioned log cabin as headquarters? Imagine, after a hard day's fishing trip, sitting before the open stone fire-place and recalling the hardships and struggles of our ancestors whose lives circled around the little log cabin. It was the heart of their existence, all their joys and sorrows, successes and failures centred there. Is it any wonder that some strange impulse draws us instinctively to such a shrine?

Many of our grandfathers as they left their rude first dwelling-place, which had been reared by their own hands, and moved into more modern homes, must have had that feeling which Robert W. Service gives expression to:

"O, dear little cabin, I've loved you so long,
And now, I must bid you good-bye!
I've filled you with laughter, I've thrilled you with song,
And sometimes I've wished I could cry,
Your walls they have witnessed a beautiful fight,
And rung to a won Waterloo!
But Oh! in my triumph I'm dreary to-night,
Good-bye little cabin, to you.

Your roof is bewhiskered, your floor is aslant,
Your walls seem to sway and to swing;
I'm trying to find just your faults, but I can't—

You poor, tired, heart-broken old thing!
I've seen when you've been the best friend that
I had,
Your light, like a gem on the snow,
You're sort of a part of me. Gee! but I'm sad,
I hate, little cabin to go.

How cold, still and lonely how weary you seem!
A last wistful look and I'll go;
Oh, will you remember the lad with his dream,
The lad that you comforted so?
The shadows enfold you, it's drawing to night,
The evening star needles to sky;
And huh! but its stringing and stabbing my sight;
God bless you, old cabin, good-bye."*

Exterior of Log Cabin at Camp Wapomeo
Algonquin Park

With these thoughts in mind, let us turn to the more practical subject of how to construct such a place of charm. The size will be determined largely by the amount of help and time available, as well as by the use to which it is to be put. We will select a plan with an inside measurement of nine by twelve feet. This will allow for two lengths

*Used by permission of Wm. Briggs.

of sleeping bunks along the back and one at each end. If bunks are built one above the other, accommodation will be provided for eight persons.

Select a site facing south, so as to get the benefit of the winter sun. Dig holes for the foundation about two feet square at each corner of the building. Go down until you strii hardpan or at least until you are below the frost line, then fill in with large stones until slightly above the level of the ground. See that all the foundations are on the same level.

Select straight trees of cedar, balsam or other soft wood. If you choose cedar, the bark may be left on. The logs should all be of about the same diameter, preferably not less than eight inches. Nineteen of them at least sixteen feet long and sixteen more at least thirteen feet long will be required.

Place two of the sixteen-foot logs on the foundation corners, so that the logs will be nine feet apart. Then lay two of the thirteen-foot logs across them directly over the foundation stones and twelve feet apart. Care should be taken to see that the corners are square. Roll the last two logs one-half turn and with a sharp axe cut a notch about half-way through that will fit snugly on to the lower log when rolled back in position. This will leave about eighteen inches projecting. Next roll on two of the long logs, one with the butt to the east, the other to the west. Follow the same rule with the short logs. Try to leave the same spaces between each pair of logs. It should not be more than three inches.

As the walls rise, care must be taken to see that the corners are plumb and that each log is on the level. Skid the logs up on two stout poles with the aid of two ropes made fast to the rear sill and thrown over the uppermost log. Carry the loose

end of the rope under the log to be raised and once or twice around it, then place the loose end in the hands of the boys on top of the wall. See fig. 1. In this way four boys can lift very heavy logs to a height of twenty feet.

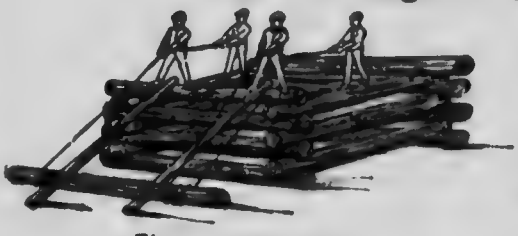


Fig. 1. Raising the Logs

When the logs are about five feet from the ground, the long log should be notched for the top of the window and door. Cut out a piece four feet long and three or four inches deep. This will allow the saw to be inserted later.

Two more logs will complete the side walls, then place the end logs with three or four small logs equal distances apart across the cabin. These can be used for hanging things from the ceiling. On top of the end logs place two long logs, so that they will be in line with the plates on either side and the ridge log. These are used to support the roof. Next place the short end logs, and on top of these the large ridge log. See Fig. 2.

Cover the roof supports as shown in Fig. 3, either with coarse grass and stiff clay or with birch bark.

Before cutting the door and window, drive wedges of wood between the logs, so that they will not settle. Fasten the door and window frames against the ends of the logs cut for them and the top and bottom logs which have been notched.

The best chinking is done by using cedar blocks about three feet long and splitting them into triangular strips which can be wedged between the logs from inside. Mud and moss or lime plaster should then be used on the outside, filling up all the cracks.

No log cabin is complete without a fire-place; it is the heart of the cabin. Dig a foundation outside the cabin at one end. Cut a hole in

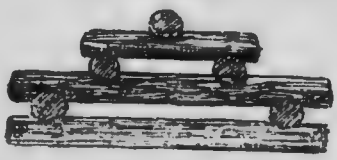


Fig. 2. Building up the Roof Logs

the same as for the door, but just large enough for the sides and top of the fireplace. The chimney should be built on the outside. The flue should be at least one-tenth the size of the opening of the fire-place and if it is one-fifth so much the better for the fire. The height of the opening should be about two-thirds of its width and its depth about half its width. The depth of the fire-place should be at least half the height of the opening.

Fig. 8. The Roof Supports.

The mantel may be made of a log flattened on one side and carved with an appropriate motto.

The Charm of the Log Cabin—the Fire Place

The breast or upper part of the fire-place opening should be supported with a piece of iron or a very heavy long shaped stone.

There are many attractive books on the building of log cabins, but perhaps the best one for boys is "Shelters, Shacks and Shanties," by Dan Beard.

How to Make a Canoe Tent

By W. R. Cook

Territorial Boys' Work Secretary for Ontario and Quebec, National Council of Young Men's Christian Associations.

HERE is a light, practical tent, big enough for two, yet weighing so little and folding so small as to be hardly noticeable on a portage. It is 7 feet long, 6 feet wide, 7 feet high at the peak and 2 feet 6 inches at the rear wall, which slopes on each side to a 1 foot wall at the front corner. It is made of 25 yards of 27-inch tightly woven cotton drill, waterproofed by an inexpensive process (the formula for which follows this article) and cost less than $5.00 to make. I did all the work myself from planning and cutting to sewing and waterproofing, so I know that any boy can make one and thus save $10.00.

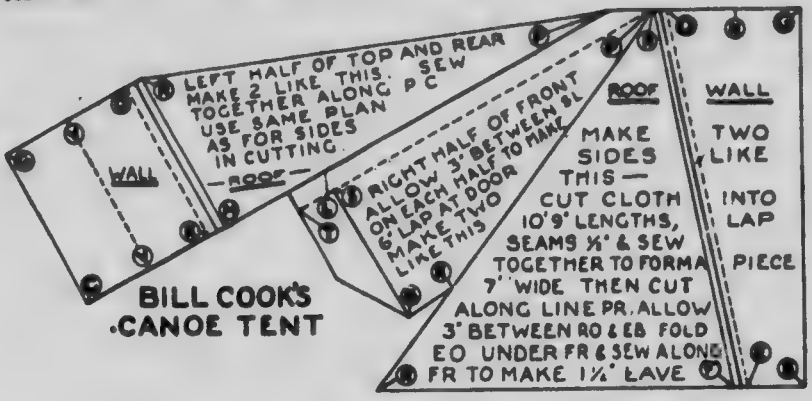
First make a paste and paper model, one quarter size, and avoid later mistakes which might be expensive.

Make the side, top and front sections separately. Lay them on the floor and see that the PR lines are all the same length. If not, trim the top to fit the sides. PF lines should also match. Trim front to match sides. Now cut a slight curve from each PR, say 2½ inches deep at the middle of the curve, cut PF on front sections only, in the same way, about 1½ inches deep. Next sew the sections together along PR and PF and half way down rear wall OV. In sewing sections together, lay them back to back inside out and stitch along a line a half-inch from the edge. Open out, turn seam flat on one side and sew

The Canoe Tent Set Up

again. This time along edge of seam. Sew the front haives together (leaving the 6-inch lap) far enough down from the top to leave a door the height you want.

Make a ventilator of fine mesh netting 6 feet wide and 1 foot, 3 inches high, framed and reinforced with cloth, and sew V to V. This leaves the lower half of the rear wall to be raised and tied up in fine weather for ventilation. Use heavy thread for all sewing.



Fasten heavy guy cords at F, R and M and one or two on each side between F and R. Put peg loops at bottom corners of wall and at bottom of front. Sew a piece of cloth 6 or 8 inches wide all around bottom for a ground cloth. Don't forget the loop of cord at the peak; and it might be well to re-inforce this peak with a couple of extra thicknesses of cloth.

Then get out and use it. A man and his wife spent two happy weeks in this little canoe tent last summer in Algonquin Park—the tent's third season—and found it very satisfactory.

Formula for Waterproofing Tent

Dissolve half a pound of alum in four gallons of boiling rain-water. It is essential that soft water

be used. Similarly, in a separate vessel, dissolve half a pound of sugar of lead (lead-acetate) in four gallons of water.

This is double the proportion of alum usually recommended, and better results will follow from it, because it insures the precipitation of all the lead in the form of sulphate. Let the solutions stand until clear; then pour the alum liquor into a clean vessel, and add the sugar of lead solution. Let stand a few hours. Then pour off the clear liquor, thoroughly work the fabric in it so that every part is quite penetrated, squeeze out, stretch and dry.

REMEMBER THAT SUGAR OF LEAD IS *POISONOUS* IF TAKEN INTERNALLY.

How to Make an Indian Tepee

By Taylor Statten

National Boys' Work Secretary, National Council of Young Men's Christian Associations.

FOR adding to the charm of the romantic and picturesque side of camping, whether in the back woods or the back yard, no tent will equal an Indian Tepee, and none is more easily manufactured at home. The writer has made two which have been used in the north woods for several summers. The first was made for a group

of Toronto boys who attended Ernest Thompson Seton's Woodcraft Indian Camp in the Adirondack Mountains in the summer of 1910. It is only ten feet in diameter, the smallest size of any practical use. Mr. Seton, who, by the way, is an old Toronto boy, furnished the suggestions for its manufacture and, later, while in camp, decorated the outside with Indian designs. It required 22 square yards of material and cost about $5.00.

Five years ago I made the second one. This is 20 feet in diameter and because of the increased size is so much superior to the smaller one that I would advise, wherever possible, that instead of two or three boys making a small one, an entire Tuxis Square should club together and make a twenty-foot tepee. Those used by the Indians are about this size. They are roomy enough to allow a good-sized fire in the center. On wet days all the cooking may be done inside.

The Completed Tepee

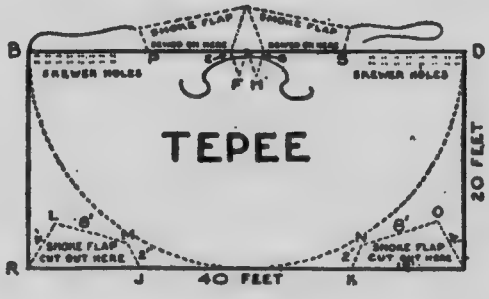
It required eighty-eight square yards of canvas to make this tepee. We used a khaki drill which cost about 20 cents a yard. We first made a model of paper, the scale being one inch to the foot, following the general directions Mr. Seton had given for the smaller tepee. Our only mistake was in increasing the size of the smoke flaps proportionately with the other measurements. This made them larger than necessary, but furnished splendid ventilation.

With a sewing machine run all your material together, making one piece 40 feet long and 20 feet

wide, then spread it out on the ground and with a piece of chalk draw a half circle, B, C, D. Mark two little triangles at A, AE 12 inches; AF and EF each two feet and the other triangle HG, the same size. Mark smoke flap as indicated by dotted line. Cut along dotted lines. Sew smoke flap to the cover, so that LM is neatly fitted to EP and NO to SG. On the long corner of each, R and I, a small three-cornered piece should be sewn to make a pocket for end of pole. Three inches from the edge BP make a double row of holes, 2 inches apart; each pair 6 inches from the next pair. Take great care to buttonhole these with strong linen thread so that they will not tear. The holes on the other side SD must exactly fit on these. Fasten an 8-foot rope by the middle at A. Fasten the end of a 20-foot cotton clothesline to J and another to K. Hem this rope all along the bottom BCD and your teepee is ready to be put up.

Although we started with twenty poles on which to erect the canvas we now use only sixteen. They should be strong, straight and smooth, and twenty-four feet long. Two extra long and slender poles are needed for the smoke flaps.

Tie three poles together twenty-one feet from the big end and erect them like a tripod with the legs equal distances apart on the edge of a twenty-foot circle. Then lay the other poles, except the smoke-flap poles, in the angles. You can now climb up the poles and with a small rope bind them securely at the top. Now pull the canvas up on the side



opposite where the door is to be by means of the two eight-foot ropes at A and fasten these ropes where the poles are bound together. Carry the two wings of the tent around until they overlap and fasten them together with the lacing pins, which should be made of tough wood about one inch in diameter and about ten inches long.

Now insert the ends of the smoke-flap poles in the pockets of the smoke flaps and allow them to rest against the sides of the tepee.

In the middle either scoop out a little hole about two feet wide and four inches deep for the fire, or, better still, get a large flat stone and build some smaller stones around it.

My large tepee has sheltered many boys in both fair weather and foul. As many as forty-five persons have squatted around the fire at one time, watching the sparks ascend through the smoke flaps and listening to the tales of the red man.

Now get busy and some evening I may have the delight of sitting around your tepee fire.

Rubbing-Stick Fire

By Ernest Thompson Seton.

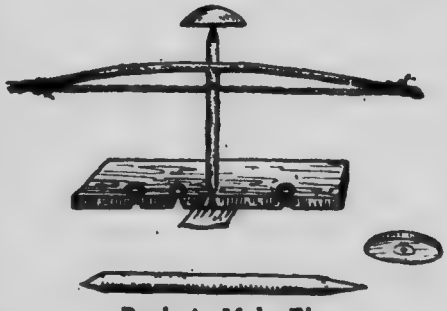
(Reprinted by permission from the Manual of the Woodcraft League.)

I HAVE certainly made a thousand fires with rubbing sticks, and have made at least five hundred different experiments. So far as I can learn, my own record of thirty-one seconds from taking the sticks to having the fire ablaze is the world's record,* and I can safely promise this: That everyone who will follow the instructions I now give will certainly succeed in making a rubbing-stick fire.

Take a piece of dry, sound, balsam-fir wood (or else cedar, cypress, tamarac, basswood, or cottonwood, in order of choice) and make of it a drill and a block, thus:

Drill—Five-eighths of an inch thick, twelve to fifteen inches long; roughly rounded, sharpened at each end as in the cut.

Block or Board—Two inches wide, six or eight inches long, five-eighths of an inch thick. In this block, near one end, cut a side notch one-half an inch deep, wider on the under side; and near its end half an inch from the edge, make a little hollow or pit in the top of the block, as in the illustration.



Ready to Make Fire

Tinder—For tinder, use a wad of fine, soft, very dry, dead grass mixed with shredded cedar bark, birch bark, or even cedar wood scraped into a soft mass.

Bow—Make a bow of any bent stick two feet long, with a strong buckskin or belt-lacing thong on it.

*This was written ten years ago. Since then the record has been repeatedly lowered by others.

Socket—Finally you need a socket. This simple little thing is made in many different ways. Sometimes I use a pine or hemlock knot with a pit one-quarter inch deep, made by boring with the knife point. But it is a great help to have a good one made of a piece of smooth, hard stone or marble, set in wood; the stone or marble having in it a smooth round pit three-eighths inch wide and three-eighths inch deep. The one I use most was made by an Eskimo. A view of the under side is shown in cut 1.

Now we are ready to make the fire.

Under the notch in the fire-block, set a thin chip.

Turn the leather thong of the bow once around the drill; the thong should now be quite tight. Put one point of the drill into the pit of the block, and on the upper end put the socket, which is held in the left hand, with the top of the drill in the hole of the stone. Hold the left wrist against the left shin, and the left foot on the fire-block. Now, draw the right hand back and forth steadily on level and the *full length* of the bow. This causes the drill to twirl in the pit. Soon it bores in, grinding out powder, which presently begins to smoke. When there is a great volume of smoke from the growing pile of black powder, you know that you have the spark. Cautiously lift the block, leaving the smoking powder on the chip. Fan this with your hand till the live coal appears, Now, put a wad of the tinder gently on the spark; raise the chip to a convenient height, and blow till it bursts into flame.

N. B.—

(1) The notch must reach the middle of the firepit.

(2) You must hold the drill steadily upright, and cannot do so without bracing the left wrist

against the left shin, and having the block on firm foundation.

(3) You must begin lightly and slowly, pressing heavily and sawing fast after there is smoke.

(4) If the fire does not come, it is because you have not followed these instructions.

CHAPTER XI

FRIENDSHIP WITH NATURE

Ferns and Flowers

By Faith Fyles, B.A.
Assistant Botanist, Central Experimental Farm, Ottawa, Ont.
Illustrations by the Author.

BOTANY, as TUXIS BOYS know, concerns plants and plant life, but were a number of boys asked if they knew anything about botany, half of them would say "no" not realizing that to know even one or two of the wild flowers by sight is a beginning of the study of botany.

To recognize the wild flowers and to appreciate how much these gifts of nature mean to us is to open the gates of a very wide field of delightful study. To learn their characters, their relations to one another and to their surroundings, is to find the field ever widening as you advance. To discover that all parts of the plant are built up with walls and partitions, cell upon cell, as castles are with stone upon stone, is to become, as it were, part master of the field free to work where you please.

Fig. 1. ½ Nat. Size

FERNS

Higher Flowerless Plants

Ferns and flowers do not by any means cover the wide range of the plant kingdom, but, apart from the trees, they form two of the most conspicuous groups in it.

The ferns and their allies come under the head of the higher flowerless plants which, as the name implies, have neither flowers nor true seeds. The graceful and varied foliage of the ferns more than supplies the want of flowers and in place of seeds there are small bodies called *spores* whose duty it is to carry on the work of reproduction. The spores, however, do not directly produce true ferns as the seeds produce true flowering plants. For instance the seeds of a sweet pea produce more sweet peas similar to the parent plant but the spores of the bracken do not produce the well known branched and spreading green leaf of the bracken.

Fig. 2. ½ Nat. Size

When scattered on suitable moist ground they produce instead, very small heart-shaped bodies, flat and less than half an inch wide. This small green body is called the prothallus. The prothallus bears on its underside two different sets of organs. The contents of these minute organs unite and their union results in the growth of the true fern plant with roots, stem and blade, or *frond* as the

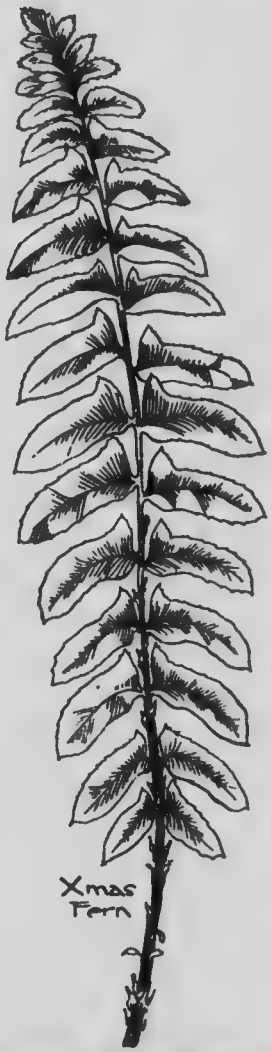


Fig. 3. ½ Nat. Size

leaf of the ferns is called. The frond is divided into *blade* and *stipe* the hart's tongue (Fig. 2) being an example of this simple type of frond. But the blade is usually divided into pinnae (singular, pinna), as in the Xmas fern (Fig. 3). The pinnae are often divided again into *pinnules* as in the cliff brake (Fig. 1). Some of the fronds are still more divided into larger divisions or branches as in the bracken, showing pinnae, pinnules and lones all on one branch of the blade.

SPORE CASES

A few of the ferns are easily recognised by their forms alone, but most of them need a much closer study and a good pocket lens is necessary. Many of the species can only be distinguished by the arrangement of their spore-cases (sporangia). The spore-cases are minute stalked bodies containing a number of still more minute spores. If you examine carefully the back of one of the pinnules of the bracken, you will find the lobes outlined by a band of golden-brown spore-cases. Around the head of each spore-case there is an elastic band of larger cells which at maturity breaks and springs back, tearing the delicate spore-case and scattering the spores far and wide (Fig. 4). The spore-cases are in most cases protected by a covering called the indusium, which, in the bracken, is double as the inrolled margin of the blade forms an outer indusium.

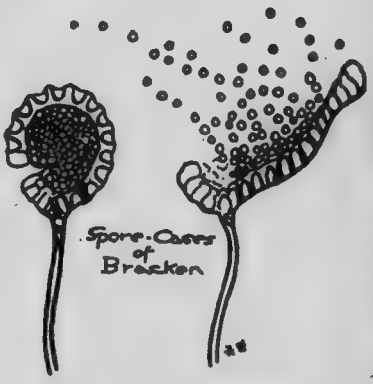


Fig. 4. Much Enlarged.

ARRANGEMENT OF SPORE-CASES

The arrangement of the spore-cases in the different kinds of ferns is most interesting. They are usually arranged in groups called fruit-dots (sori) or in lines or bands as in the bracken. Sometimes

the fruit-dots are round, oblong, crescent-shaped, others are in irregular masses, or under little pockets as in the maiden-hair fern. The indusia are also of different shapes so as best to protect the little groups of spore-cases entrusted to their care. When their protection is no longer needed they shrivel and disappear. It is easiest to study the ferns when some of the indusia at least are present. In the sensitive fern, ostrich fern and cinnamon fern, the spore-cases are borne on an entirely separate frond called the *fertile* frond to distinguish it from the green sterile frond whose work it is to produce starch while the fertile frond is busy producing spores. In the adder's tongue (Fig. 5) and the moonworts, the spore-cases are arranged in spikes on the same stalk which bears the green blade, the spike arising from the base of the inner face of the blade.

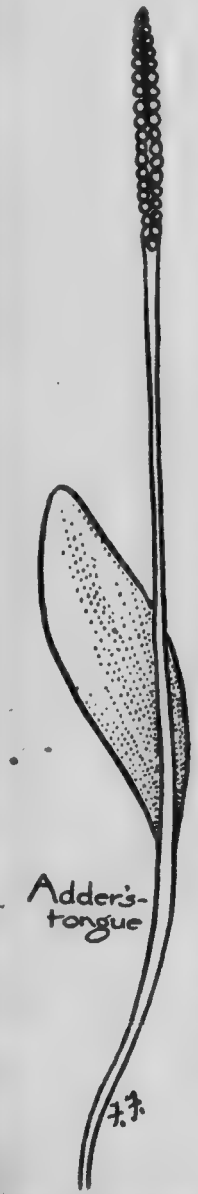


Fig. 4. ½ Nat. Size

OTHER MEANS OF PROPAGATION

The spore is not the only means of reproduction among the ferns. Some species develop new plants by means of creeping rootstocks as in the polypody, bracken and sensitive fern, or by means of bulbils as in the bladder fern, or by the tip of the frond bending over to take root as in the walking fern.

Fern Families

The ferns are divided into families, the families into *genera* (singular genus) and the genera into species. There are only five families of ferns represented in Canada, the bracken family or fern family proper, the climbing ferns, the flowering ferns, the adder's-tongue ferns, and the floating ferns. Of these five families, two have only one species growing in Canada; that is the climbing fern family represented by the Schizaea or curly grass growing in Newfoundland and Nova Scotia;

and the floating fern family represented by the little Azolla floating on quiet waters like the duckweeds. It is especially common on the Shuswap Lakes, B.C.

BRACKEN FAMILY

Of the three remaining families, the brackens have the greatest number of genera and species. The most important of these are the common polypody with round conspicuous sori, found almost everywhere in shady places mostly on rocks; the beech fern with triangular fronds; the graceful maidenhair with shining ebony stripes; the larger coarse bracken; the small cliff bracken; the slender rock brake with its fertile fronds rising above the sterile which have broader lobes somewhat resembling the leaves of parsley; the various fine spleenworts, of which perhaps the lady-fern is the most common; the hart's tongue; the walking fern; the Xmas and holly ferns; the shield ferns of which there are several species growing in Canada, the little brownish woodsias growing on moist mossy rocks and in the clefts of cliffs; the sensitive fern common in moist meadows and open wet woods with its erect, rigid fertile frond of the past season, conspicuously dark fertile fronds which appear in the centre of a crown of leaves.

Fig. 6. ¼ Nat. Size

FLOWERING FERN FAMILY

Of the flowering fern family three species are common in Canada, the royal or flowering fern proper (Fig. 6) which develops spores on a few of the pinnules at the tip of the blade; the interrupted fern or Clayton's fern (Fig. 22)

with a few pinnae devoted to spore-making in the centre of the frond; and the cinnamon fern whose dusty, cinnamon-colored, fertile frond is quite distinct from the green sterile ones.

Moonwort

Fig. 7. ½ Nat. Size

ADDER'S-TONGUE FAMILY

The adder's tongue is not common in Canada, but when found it is easily recognised by its rather thick, oval, simple blade and its erect spike of two rows of spore-cases looking like two rows of beads.

The Moonworts are represented by several species and varieties. They have a branched fertile frond which, like the adder's tongue arises from the base of the inner face of the green blade. The blades of the moonworts (Fig. 7) are also divided or compound.

FERN ALLIES

The Common Horsetail

There are two groups of plants closely allied to the ferns, with which TUXIS BOYS should be familiar. They are the horsetails and the club-mosses.

The horse-tails or scouring rushes, so called because some of the species have been used for brightening tinware, are rush-like plants with jointed and mostly hollow stems. The common one in Canada is the field horsetail (Fig. 8). It has both sterile and fertile annual stems arising from an underground perennial rootstock. The fertile stems appear in the spring about two weeks before the sterile stems. They are yellowish with toothed sheaths of a reddish brown colour and bear the spores under little shield-shaped leaves on a terminal cone. The sterile shoots are bright green with angled branches.

Common Club Mosses

There are several species of club moss in Canada, more or less familiar to those who go to the woods to gather green for Xmas decorations. The stem of the common club moss (Fig. 9) lies flat upon the ground, creeping extensively and sending up at intervals short and very leafy branches. Some of the branches produce a slender stalk bearing from two to four cylindrical spikes or cones. These are the fertile branches which bear the spores in little pockets on the base of the upper side of each leaf. The small sharply pointed leaves are very similar in type to the cones of the pine-trees and for this reason the club-mosses are sometimes popularly called ground-pines.

WILD FLOWERS

Flowering Plants

The flowering plants are divided into two large classes, the monocotyledons or those with one seed leaf, and the dicotyledons with two seed leaves.

Monocotyledons

In the former class, aside from the rushes, grasses and sedges which are too difficult for the beginner, the lily and orchid family contain the greatest number of species in Canada.

The lilies whose floral leaves are arranged regularly in sets of three, form one of the most attractive groups of our spring and early summer flowers. There are about 45 species growing in Canada among which may be mentioned the bellworts, trilliums, clintonias, the tiger-lilies, yellow adder's tongue (Fig. 10), erronously called dog's-tooth-violet, Wild

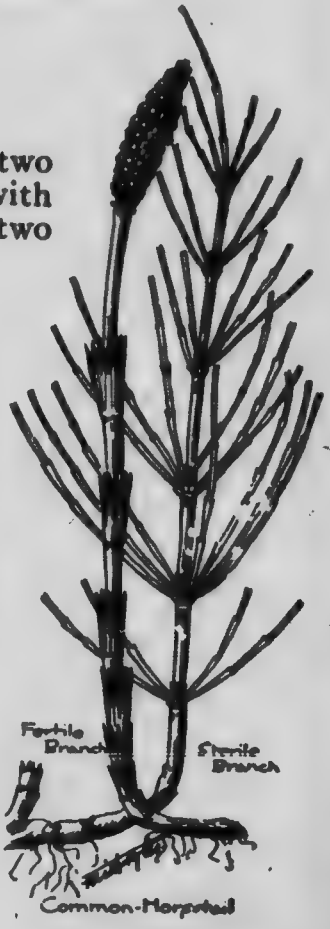


Fig. 8. ½ Nat. Size

Fig. 9. ½ Nat. Size

onions, true and false Solomon's-seal, the poison and the edible camas, the fritillaries, the Indian-cucumber-root, the false hellebore, and the mariposa lilies or species of calochortus. Every boy should be able to find in the woods, at least one of the kinds of trillium with its white wavy-edged petals striped with deep rose towards the centre (Fig. 11), also at least one clintonia either that with 3 or 4 pale greenish-yellow flowers at the top of the single, white-flowered species of the Rockies, both species having large simple root leaves and blue berries, and the yellow adder's-tongue with its shining, mottled green and brown leaves and nodding yellow flowers.

ORCHID FAMILY

The orchids are a very interesting group, not only because of their curious shapes and devices for cross-pollination, so arranged that only certain insects can fertilise the different species; but also for their fine coloring and rarity as well as their habit of producing an enormous number of minute seeds only a very few of which either germinate or reach maturity. Thus it is that orchids are seldom found in large masses and for this reason they should be treated with care. Specimens carefully selected from plants growing too close together will do no harm, but general uprooting should be discountenanced.

There are about fifty different kinds of orchids native to Canada. Some of them have large inflated lips like the lady's-slipper (Fig. 12) or moccasin flower, and the little calypso. Others have lips that are fringed and sometimes a long spur, as in the different kinds of rein and fringed

orchids. Although many of them are sweet-scented, a few like the Pogonia and the ladies' tresses have a rich and rare perfume. The coral-roots are so named because their thickened roots closely resemble the branching of coral, and the rattlesnake plantain (Fig. 14) gets its name from its curiously marked green and white basal leaves.

ARUM FAMILY

We cannot leave the monocotyledons without saying a word about the arum family, whose members are distinguished by a unique arrangement of a *spadix* or spike of small flowers and a sheath or *spathe* which serves as a protection until the seeds are set. Among them are the well-known Jack-in-the-pulpit (Fig. 13) also easily recognised in the autumn by its bunch of scarlet berries with the withered spadix at the top and remnants of the spathe beneath; the water-arum or wild calla, the green-dragon and the skunk cabbages of the east and west.

Fig. 10. ½ Nat. Size

Flowering Plants—Dicotyledons

If the families of the dicotyledons were classified according to the number of species occuring in Canada, the composite or thistle family would stand first as it has the largest number; the roses would come next followed closely by the pulse or pea family, then the figwort family and the crowfoot or buttercup family. But the accepted order of classification places the thistle family at the end of a very long list. Leaving out the figworts for want of space, the remaining four largest families are also four of the most important.

CROWFOOT FAMILY

The Crowfoots provide us with many beautiful garden flowers, among them the various peonies,

larkspurs, columbines and monkshoods; the different species of clematis, anemone and globe-flower. They also contain a number of poisonous plants as the bane-berries, marsh marigold, some of the buttercups, the larkspurs and monkshoods. Many of the family are common flowers of the early spring and summer. The two hepaticas, one with rounded leaves and the other more sharply lobed are among the first to appear, sometimes sending up their furry buds and stalks through the snow. The marsh marigolds with their large yellow flowers and round shining leaves are common in moist places and along streams. The goldthread, recognized by its slender yellow rootstocks lying close to the surface of the soil, is found in mossy woods and swamps. It has three shining evergreen leaflets and delicate white flowers appearing early in the summer. The anemones have rather large flowers and characteristic fruiting heads. The seeds or *achenes* are either short-pointed closely massed into compact heads or with long, feathery appendages. One of the most handsome is that of the prairies, the pasque-flower, erroniously called wild crocus. Its flowers, enveloped in silvery-hairy bracts, appear before the leaves. The yellow stamens in the centre of the purple cup-like flower, circle the group of white styles which later make kites of the seeds with their long feathery tails. The native columbines (Fig. 15) are easily remembered by their five long spurs and honey-sacs turned towards the sky till after pollination when the flower gradually turns on its stalk until the seed vessels are erect.

Fig. 11. ½ Nat. Size

ROSE FAMILY

The rose family, besides including all the wonderful variety of roses of many shades, colors and perfumes, also contains an equally wonderful variety of apples, peaches, plums, pears, quinces, cherries, strawberries, raspberries, blackberries, June-berries and hawthornes. Some of the less conspicious members are the two species of Dryas of the west, one with white flowers called wood-nymph or white mountain avens, and the yellow mountain avens; the many species of potentilla or cinquefoil: the yellow-flowered barren strawberry with its three-lobed wedge-shaped leaflets; and the several kinds of avens proper, the three-flowered avens being found both east and west.

PULSE FAMILY

The pulse or pea family stands second to the grass family in the importance and usefulness of food and fodder plants. We owe to it all our various peas, beans, lentils, clovers, vetches and alfalfas. They all bear the same general type of seed-pod, or legume like the familiar pea or bean pod, which is a single chamber with a row of seeds down one side. But this general type varies greatly; sometimes it is coiled spirally as in the alfalfas and spotted medick pods, sometimes the pods are very thick and form partitions between the seeds as in the broad bean, while in the tick-trefoils they appear to be jointed and break up into one-seeded portions; often the pods are very small, containing only one seed as in many of the clovers. With a few exceptions,

Fig. 18. ⅛ Nat. Size

Fig. 13

the flowers of the legumes are butterfly shaped as in the sweet pea. Sometimes the flowers are large and single, sometimes in a round head as in the red clover, and often in long, narrow, loose clusters as in the common blue vetch; but small though many of them are, they are all modelled after the shape of the sweet pea which is not copied by any other family.

Among the more conspicious of the wild flowers are the lupines with long clusters or *racemes* of mostly blue flowers and several long narrow leaflets from the top of the leaf-stalk; the psoraleas, both the

silver-leaf and the edible species, which is called the prairie-apple or prairie-turnip, on account of its thick root; the three prairie clovers, all of which have their small flowers arranged in close, elongated heads usually with only half of the flowers open at the same time. The clovers all have odd-pinnate leaves, that is with leaflets arranged on each side of the stalk and one at the tip. The three species in Canada are the white, the purple (Fig. 16) and the silky prairie clover. The ground-plum, with violet purple flowers arranged in short, loose clusters and a fleshy edible pod comes in this class also. The vetches and the vetchlings are distinguished by their tendrils which are thread-like growths replacing some of the leaflets at the end of the leaf-stalk. The tendrils are wonderfully sensitive and reach out for means of support like the arms of a human being—if one tendril fails to find suitable support then another reaches out, in this way the plant climbs. The tendrils are sensitive to touch on all sides and bend in the direction of the side touched. You will notice in your observations of plant life that there are different kinds of tendrils on different plants as, leaf-stalk tendrils, branch tendrils and tendrils with little disks at their ends by which they grip and hold fast to objects otherwise impossible to cling to.

Other Families

Without taking up too much valuable space, a few words should be said about the cashew family, the violet family, the parsley or carrot family, the mint family and some of our wild berries before discussing the larger of all the families, that is the composite or thistle family mentioned above.

Poison Ivy

One of the most important plants in the cashew family to boys, is the poison ivy, as it will be met with on

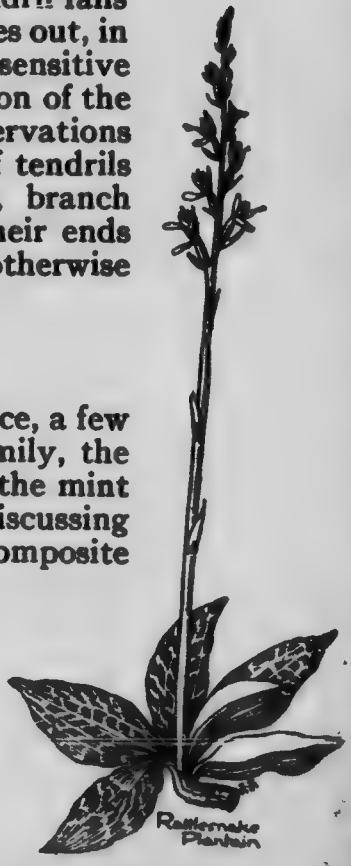


Fig. 14. ½ Nat. Size

most out-door excursions. It is found in hedge-rows, thickets, woods and along the banks of wooded streams. It is known by its three leaflets at the end of the stalk, by its small greenish-white flowers clustered in the angle of the leaf-stalk and stem, and by its shabby white berries about a quarter of an inch in diameter with ridges slightly darker running from top to bottom. To many people it is poisonous to touch and causes a severe skin irritation and blistering. On all outings a piece of yellow laundry soap should be carried and the hands washed thoroughly after coming in contact with it. Susceptible people are sometimes poisoned by merely passing near it as the plant exhales its poisonous principle.

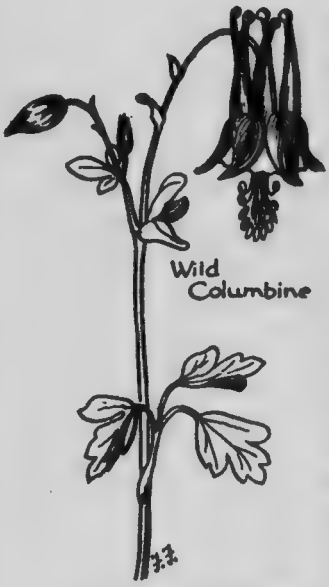


Fig. 16—½ Nat. Size

VIOLETS

The violets are well-known flowers of the spring time, both the simple-stemmed and branched species. Among the former are the marsh blue violet (Fig. 17) with its dark centre; the prairie violet, with its deeply cut leaves like those of the larkspur; the great-spurred violet with its spur-about as long as the pale violet petals, swollen and rounded at the end; the sweet white violet and the northern white violet, the latter distinguished by its more rounded leaves and tufts of hair on two side petals.

Of the branched violets the yellow-flowered species is one of the earliest blooming. The Canada violet has white, fragrant flowers striped with fine dark lines, and the long-spurred violet has a fine, narrow spur slightly longer than the lilac-colored petals which are spotted with a deeper shade towards the centre.

PARSLEY OR CARROT FAMILY

Most of the flowers of the parsley or carrot family are arranged in umbels like an open umbrella. They are rather difficult for the student without guidance and should be handled with care as some of them are edible while others are highly poisonous. The poison hemlock, famous from ancient times, grows on dry ground and has a distinct disagreeable mousy odor. The water hemlocks frequent low, wet lands, margins of shallow streams and lakes. The stem is streaked with purple and at the base when cut lengthwise through the middle, a number of transverse partitions (Fig. 18) will be seen. The roots are thick and fleshy. A very small portion eaten and digested will kill a human being or animal in a few minutes.

Fig. 16—½ Nat. Size

MINT FAMILY

The members of the mint family are easily recognised by their distinct characteristics. They almost all have four-sided stems with opposite leaves. They are strongly aromatic. The flowers are usually distinctly two-lipped with four stamens, two short and two long, attached to the inner face of the petals. Many of them are used for perfumes, medicines, confectionery and culinary purposes, as the lavendar, rosemary, peppermint, mint, horehound, sage, balm, summer savory, basil and thyme. Many of the mints have very interesting methods of ensuring cross-fertilization. If you notice a bee visiting the sage, for instance, which grows in almost every garden, you will find that on entering the flower he receives two sound knocks on the back by way of a welcome, As a result of this attention from the pollen-sacs. he carries away on his back hundreds of little

pollen grains which are brushed against the stigma as he makes his way into an older flower. In this way the plants which cannot themselves move about make carriers of the bees.

WILD FRUITS

There are a few families which produce a large number of small edible fruits, such as gooseberries, currants, blueberries and huckleberries besides wild cherries, choke-cherries, raspberries and haws mentioned in the rose family. The saxifrage family supplies us with wild gooseberries and currants as well as many delightful spring and summer flowers, as the early saxifrage (Fig. 19), the true and false mitreworts with their seed vessels resembling bishops' mitres, and the charming white flowers of the grass of Parnassus on slender stalks with firm roundish leaves clustered at the base. The flowers of the gooseberries are either single or in clusters, ripening into long bunches of fruit. The prickly gooseberry has rather large berries armed with prickles and the smooth gooseberry produces a fruit which is practically free from spines.

Fig. 17—½ Nat. Size.

Of the currants, the swamp black currant with its bristly purplish black fruit and the swamp red currant with its smaller red fruit, are the most widespread, being found in wet woods and swamps across the continent. The wild black currant, found on drier soil, has smooth fruit and rather large yellow or whitish flowers. The skunk currant is known by its fetid odor, its erect slender clusters of flowers and its red bristly fruit.

The blueberries, cranberries and huckle berries all belong to the heath family. The low, sweet blueberry is the earliest to bloom and ripen its fruit for the

market. Its numerous flowers are narrowly bell-shaped, white and pinkish. Its small leaves are bright green, smooth and shining. The Canada blueberry is distinguished by its leaves which are downy on both sides and its somewhat larger berries covered with a rich bloom, and ripening later.

The huckleberries are very much like the blueberries in general appearance, but they have black or red, usually erect, fruit without a bloom.

While the blueberries and huckleberries are erect shrubs with sweet fruit, the cranberries are slender creeping or trailing plants with red acid berries and small evergreen leaves.

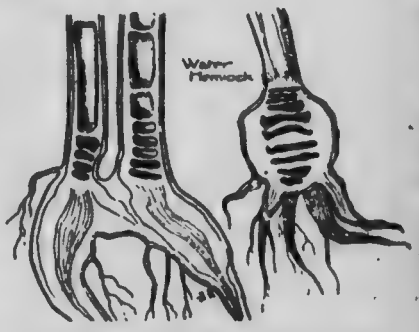


Fig. 18—¼ Nat. Size, Deadly Poison

There is another native fruit called the high-bush cranberry which belongs to quite a different family, i.e., the honeysuckle family. The high-bush cranberry has large clusters of scarlet acid berries with a single flat stone in the centre. This cranberry-tree as it is sometimes called, has several relatives, all species of Viburnum, which produce edible fruits. The two species in Canada known as the sweet Viburnums are the Withe-rod or Wild Raisin and the Sheepberry or Nannyberry. Both are shrubs or small trees with sweet blue-black fruit containing flattish stones, and somewhat oval leaves with small teeth. Both have whitish flowers in flat-topped clusters, but the Withe-rod has a short stalk to its flower-cluster while the Sheepberry has none at all.

The small native fruits of the rose family, as the strawberries, raspberries, blackberries and different cherries, are well known, but the June-berries are not usually recognised as edible fruits. There are six or seven species growing in Canada. All

are small trees or shrubs with simple oblong, oval or roundish leaves with white flowers in long, loose clusters or sometimes solitary. The Canada Juneberry or Shad-bush as it is called (Fig. 20) grows from five to thirty feet high or higher. The leaves are oval, rounded or heart-shaped at base, finely saw-toothed, white woolly when young, smooth with age. The flowers are fairly large on slender drooping stalks, the five white narrow petals three or four times the length of the *sepals*. The berry is round, crimson, becoming sweet, juicy and purple when fully ripe. The alder-leaved Juneberry, (called also the North-western June, or service-berry and locally the Saskatoon berry) is a much smaller shrub usually about six or eight feet high with short-oblong or round-oval leaves showing coarser teeth towards the apex, smooth above, somewhat hairy beneath. The flowers are on shorter stalks. The five petals are somewhat wedge-shaped about twice as long as the sepals. The fruit is purple, sweet and juicy, with a bloom. Other species, though more or less similar in general appearance, differ in detail.

Fig. 19—½ Nat. Size

COMPOSITE OR THISTLE FAMILY

The last and largest family of flowering plants, the composites, is made up of those species whose flowers are arranged in heads on a common receptacle surrounded by a circle of bracts called an *involucre*. There are two main divisions of the composites those with tubular flowers and those with strap-shaped flowers. The first division is the larger and contains all those plants whose petals are united to form a small tube, that is of the perfect flowers composing the centre; the marginal or ray-flowers are strap-shaped. A familiar example of this class is the common ox-eye daisy with its central disk of yellow tubular

flowers and its white strap-shaped marginal flowers all surrounded by a green involucre of bracts. To this class also belong all the snakeroots, the blazing stars, the asters, the gum-weeds, the goldenrods, the flea-banes, the everlastings, (Fig. 21) and cud-weeds, the sunflowers, ragweeds and cockleburs; the brown-eyed Susans, bur-marigolds and cone-flowers; the sneezeweed, yarrow, gaillardia, tansy, and worm-woods; the coltsfoot, arnica and rag-worts; the burdocks, thistles and star-thistles. The second class, the strap-shaped flowers, are all further distinguished by a milky juice which exudes on breaking the stems or foliage. Well known plants of this class are the chicory, hawkbit, salsify and yellow goat's-beard, the dandelion, sow-thistles, lettuce and hawkweeds.

PREPARATION OF A HERBARIUM

Collecting

In studying the wild flowers TUXIS BOYS will naturally have a desire to make a collection or herbarium for your own use. If possible, the specimens should be collected in the morning on a dry day, as the plants are then in better condition. Avoid all deformed, misshapen specimens and those that have been attacked by insects. A typicla plant should be chosen, one that is neither too big nor too little. Where it is impossible to take the whole plant, roots, stem, leaves, flowers and fruit, portions should be cut showing as many of these as are obtainable at the time. When no fruits are present with the flowers, the plant should be marked for a later visit. It is interesting also to watch for the young plants, particularly for the first year growth of biennials and perennials. Thick-stemmed plants

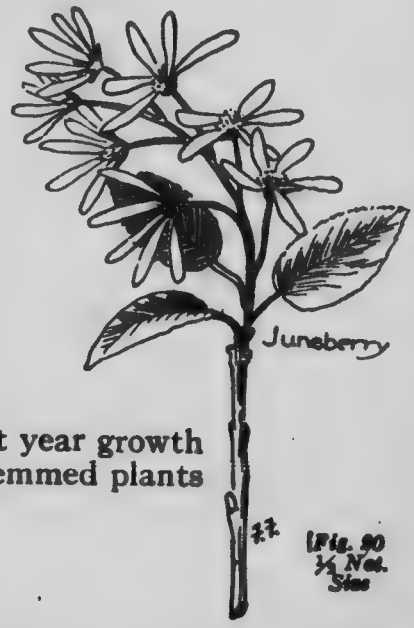


Fig. 90 ½ Nat. Size

and swollen roots may be cut in two before being pressed, saving both portions as you will want to show both the inner and outer sides.

Pressing and Drying

It is best to take out into the field with you as little as possible. All that is really necessary is a pocket pad and pencil, a hand-press and something with which to dig up the plants. A simple press may be made out of two pieces of strong cardboard size 12 x 18 inches—what is known as beaver board is best. Put the two pieces together and with an auger bore two rows of holes ¾ inch in diameter at an even distance from each other and the margin. Place between the two cardboards as many drying papers as you need for the day and strap all together with a good shawl-strap. This makes a light and convenient press which may be strapped as tightly as you please. The botanical felt drying papers are the best, but newspapers cut the size are very good with layers of white tissue paper next the plants.

Fig. 81.
Prairie Everlasting or Cat's-paw. ½ Nat. Size

Ordinary white blotting paper is excellent, and may be used with care for almost as long a time as the felt paper. It is an advantage to have a sheet of white tissue paper above and below the specimens for two reasons, that you can see through the paper if any part is disarranged and also the specimen may be lifted without disturbance when you change the drying papers. To save time the press should be filled before you start with alternate layers of tissue paper and drying paper, first one or two sheets of drying paper according to thickness, next two sheets of tissue paper and so on. It is safest to put your specimens in the press as you collect them. Spread out the leaves and flowers in as natural a position as possible, avoid-

ing doubling and folding of the leaves. Show the underside of one or two leaves and flowers if possible. On a sheet of your pocket pad write the name of the plant (if you know it, if not a note as to color and perfume will help) the day, month, and year of collecting with the collector's name. These data are imperative if you wish your collection to be of use and value, and should be put with each specimen. When you have finished collecting and arranging, strap tightly and hang the press in the sun; the holes in the sides will let the moisture escape more readily. On coming home, the drying papers should be changed. At the same time you may rearrange any crumpled specimens. If you wish to use your press the next day, the specimens may be put on a wide flat board with another on top and then weighed with about two dozen or more bricks. The drying papers should be changed once daily the first week.

If you prefer, you may buy a very useful press in two pieces, each made of 5 narrow strips of light hard wood 18 inches long crossed by 6 strips 12 inches long and fastened firmly together. There is also to be had a well made tin box called a *vasculum* with a small door and a shoulder strap. This is useful if you wish to bring back with you, fresh specimens for further study.

The INTERRUPTED FERN

Fig. 88
⅓ Nat. Size

Mounting

Most, at least, of the specimens should be dry in two weeks' time. For mounting them, you should secure a good quality of white drawing paper and have it cut to the regulation size 11½ inches by 16½ inches.

In mounting, *care and neatness are essential.* For small, delicate specimens you may use very narrow strips of gummed paper put in place with a pair of forceps. The ends of the strips may sometimes be hidden under some of the leaves. For heavier specimens it is best to cut small slits in the mounting paper, one on each side of the stem and put the ends of narrow strips of a fairly heavy paper through to be gummed down securely on the wrong side. If you have several strips to be put on one specimen, they may all be put through at once, the sheet and specimen turned over carefully and then the strips all gummed down at once. Ways and means will come to you with practice. The main object is to have your specimen as neat and firmly mounted as possible without attracting undue attention to the strips of paper.

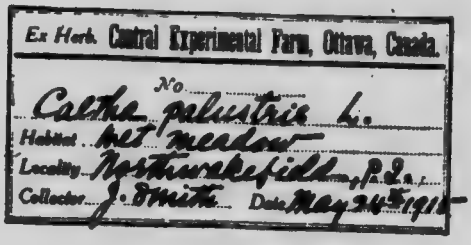

Ex Herb. Central Experimental Farm, Ottawa, Canada.
No.
Caltha palustris L.
Habitat Wet meadow
Locality Northwakefield, P.Q.
Collector J. Smith Date May 24th 1911

Fig. 23
Label for Mounted Specimens

After mounting, the specimens should be neatly labelled, on a separate small label (Fig. 23) with the scientific name of the plant, *i.e.* the generic, specific and the author's name; the habitat, the locality, the date and the collector's name. The different species of the same genus should then be put in a genus cover that is a folder of heavy manilla paper, 12 x 18 inches with the name of the genus in the

lower left hand corner, that will be next the folded edge. The herbarium labels should be placed on the lower *right* hand corner of the sheets. A cupboard with shallow shelves and doors makes a convenient place for your collection.

LIST OF BOOKS DEALING WITH THE FLORA OF CANADA

Technical

Gray's "New Manual of Botany."

"A Handbook of the Flowering Plants and Ferns of the Central and Eastern United States and Adjacent Canada." By B. D. Robinson and M. L. Fernald, 1036 illustrations. American Book Co., New York, 1908. $2.50.

"Elementary Flora of the Northwest." By T. C. Frye and G. B. Rigg. No illustrations. American Book Co., New York, 1914. (72 cents).

"Flora of Southern British Columbia and Vancouver Island." By J. K. Henry. No illustrations. W. J. Gage & Co., Toronto, 1915. Probably $2.00.

Popular

"Studies of Plant Life in Canada." By Mrs. C. P. Traill, 20 color plates. William Briggs, Toronto 1906. Probably $2.00.

"Field Book of Western Wild Flowers." By Margaret Armstrong. 500 illustrations and 48 colored plates. G. P. Putnam's Sons, New York, 1915. $2.00 net, postage 15 cents.

"Wild Flowers of the North American Mountains." By Julia W. Henshaw. Numerous plates, some colored. Robt. M. McBride & Co., New York, 1915. $2.50 net.

"A Manual of Weeds." By Ada E. Georgia. 385 figures. Macmillan, New York, 1914. $2.00.

"Who's Who Among the Wild Flowers and Ferns." By W. J. Beecroft, New York; Moffat, Yard & Co., 1917. Numerous illustrations. Price, $1.50.

FREE FROM PUBLICATIONS BRANCH
DEPT. OF AGRICULTURE, OTTAWA

"Weeds and Weed Seeds." By G. H. Clark. Bulletin S-8, 1914, illustrated.

"Medicinal Plants and Their Cultivation in Canada." By J. Adams. Bulletin 23, Second Series, 36 illustrations, 1915.

Parcels of specimens for identification up to 12 oz., may be sent post free to the Dominion Botanist, Experimental Farm, Ottawa.

How to be Sure of Mushrooms

R. E. Stone, Ph.D.,
Lecturer in Botany, Ontario Agricultural College.

ALL of us are acquainted with green plants such as trees, flowers and grass, and when we think of plants it is these which we have in mind, but there are other plants which are not green and which do not produce flowers or seeds and are often more or less inconspicuous. These are associated with the spoiling and decay of food, wood, etc. When a piece of bread is left in a warm, moist place, it soon becomes covered with blue or black mould. This mould is a plant belonging to a class of plants

known as fungi. In like manner wood, straw or leaves, if kept moist, are soon covered with a growth of fungi which may form large, woody or fleshy masses.

The term mushroom is used to mean these large woody or fleshy fungi, and toadstools are the same plants. They may be seen growing on the trunks of trees, on stumps or fallen logs, coming out of the leaf mould on the forest floor or in the grass of gardens, lawns, fields, pastures or along the roadside. The plants may look like balls, shelves, brackets, or caps supported on slender stems, or branched and coral-like. In color they may be pure white, pink, red, yellow, blue or brown, but they are never grass green.

It is seldom that we see the whole plant. The part we see is the fruit body which relates to the whole plant much as an apple to an apple tree. The feeding part called the spawn or mycelium consists of fine white or colored threads running all through the material upon which the mushroom is growing. This spawn causes the wood and leaves or straw to rot and in so doing utilizes a certain portion of the decaying material as food.

After the spawn has grown for a considerable time, sometimes a few weeks, sometimes for years, it then fruits, that is, produces the structure we call the mushroom.

Parts of a Mushroom

In order to understand the structure of a mushroom let us examine the common cultivated kind.

What we call a "mushroom" is only the fruit body of a fungus growing in decaying material. This fruit body consists of a cap two or three inches

in diameter supported on a stalk which comes up out of the ground. This stalk is three or four inches long and about one-half inch thick and quite solid. Both the stalk and cap are white with a tinge of brown. On the under side of the cap are a large number of thin plates called gills, standing on edge and radiating out from the stalk like the spokes of a wheel. At first the gills are protected by a thin veil which finally breaks away from the edge of the cap and then forms a ring on the stalk. While the gills are still protected by the veil they are white, but after the veil becomes a ring the gills first become pink and later dark brown or nearly black.

In some of the wild mushrooms, for example those growing on logs and stumps, there may be no stalk at all but the cap is attached by one side. In a few forms, especially in some poisonous forms, the stalk has at its lower end a large cup or scaly bulb called a volva.

Where to Look for Mushrooms

Mushrooms may be found from the time the ground thaws out in the spring until it freezes up in the fall. They are most plentiful after prolonged wet weather in summer and fall. It is best to look for them on damp, dewy mornings, a day or two after warm rains.

Coral Fungus

They grow any place where there is plenty of decaying vegetables or animal matter that is not too much disturbed by cultivation. Some kinds grow in rich, well-manured lawns, others in pastures, several varieties along the roadside. Some delicious kinds grow in barnyards. Many grow best in the woods, some in the leaf mould, some on stumps, some on logs and a few on standing trees.

How to Know Mushrooms

There are in Ontario at least 150 kinds of fleshy fungi which are large enough to attract the attention of a person collecting mushrooms for table use. However, not all of these can be used for food, as some of them are poisonous, and a few, which occur only occasionally, have unknown properties.

When one is gathering mushrooms one of the first questions asked is "How do you tell mushrooms from toadstools?" This question implies that the inquirer thinks of mushrooms as edible and toadstools as poisonous. It may be answered by saying that mushrooms and toadstools are the same. There is no sharp line of distinction between poisonous and edible mushrooms. We sometimes hear of the peeling test, but it is useless, as some of the most poisonous mushrooms peel as readily as the cultivated one. The blackening of silver was at one time supposed to indicate the poisonous properties of toadstools, but this test is of no value whatever. Some people say to collect only those which grow in fields and pastures. Unfortunately, some of our deadly poisonous mushrooms sometimes grow in fields and lawns; besides if one doesn't collect mushrooms in the woods he misses a very large number as well as some of the very best.

The only way to be sure that the mushrooms gathered are wholesome is to learn to know them by their characters the same as we learn to know other plants. This may be done by going out with someone who is familiar with mushrooms and has gathered them for use many times; or one may learn to know the mushrooms by gathering the different kinds and carefully comparing them with pictures and descriptions; or the mushrooms may be gathered and carefully wrapped and sent to the Department

of Botany, Ontario Agricultural College, Guelph, Ont., for identification.

The Poisonous Mushrooms

Since the deadly poisonous mushrooms are few in number, one can readily learn to know them and leave them alone.

These deadly poisonous mushrooms all belong to the genus Amanita and have certain characteristics in common. First: they all have white gills which always remain white, never turning pink or brown at maturity. Second: the stalk has a white ring which is firmly attached to it. Third: the lower end of the stalk ends either in a distinct cup as in the Deadly Agaric or in a scaly bulb as in the Fly Agaric.

The Deadly Agaric (Amanita phalloides, Fr.) is common in damp woods, although sometimes appearing in lawns. The cap may be yellow or olive in color and generally smooth and somewhat slimy when fresh. The stalk is white and hollow. The gills are white and remain white. The ring is white and firmly attached to the stalk. The stalk comes up from a distinct cup or volva, which is usually deeply buried in the soil.

The Destroying Angel is also very common. It resembles the Deadly Agaric very closely, except that it is pure white.

The Fly Agaric is a large, beautiful mushroom, commonly found in open woods. The cap is yellow to red—and has numerous loose, white scales. The stalk is white and bears a firm white ring. The gills are white. The stalk arises from

a shaggy bulb which is generally deeply buried in in the soil.

If one learns to know these mushrooms and avoids them, all serious danger will be avoided.

Edible Mushrooms

There are so many edible mushrooms that there is not room in the present book to describe them.

All the Puff Balls are good while they are still white inside. The Coral Fungi are good, as are also the Morels. Ink Caps and Shaggy Manes should be collected before they begin to turn black and melt down. The mushrooms without a stalk are good, as are all those whose gills are at first white, later turning brown.

When gathering mushrooms with white gills great care should be taken to be sure that they do not have a ring on the stem and a cup or shaggy bulb at the base of the stem.

Rules to be Observed in Gathering Mushrooms

No simple rule can be given for telling the poisonous mushrooms. Great care must be taken to dig up the plants so that all the characters can be seen and the following plants should be discarded.

(1) Those in the button or unexpanded stage; also those in which the flesh has begun to decay, even if only slightly.

(2) Those which have stalks with a swollen base surrounded by a sac-like or scaly envelope, especially if the gills are white.

(3) Those which have a milky juice, unless the milk is reddish.

(4) Those in which the cap or pileus is thin in proportion to the gills, and in which the gills are nearly all of equal length, especially if the pileus is bright colored.

(5) Avoid all tube-bearing fungi in which the flesh changes color when cut or broken or where the mouths of the tubes are reddish, and in the case of other tube-bearing fungi experiment with caution.

(6) Fungi which have a sort of spider web or wooly ring around the upper part of the stalk should in general be avoided.

(7) In case of doubt avoid the plant.

Little Puff Ball

The Preservation of Mushrooms

It is quite difficult to preserve Mushrooms in such a way as to show the minute characteristics by which species are recognized. However, the following method may be found of some value.

Place the Mushrooms in a small glass jar or wide-mouthed bottle, and add sufficient 4% formaldehyde to cover the specimens. Then add a small amount of bluestone to help preserve the color. Of course the bottle should be sealed. This may result in a very bulky collection and one hard to handle.

If the Mushrooms are slightly pressed and quickly dried some of the characteristics are preserved but one must be extremely familiar with Mushrooms to determine the various species from such dried specimens.

The above first-described method, however, may be used in order to enable a collector to positively identify and recall from time to time the distinguishing marks of such of the edible mushrooms as he may decide to patronize and the poisonous kinds that he must avoid.

The collector can if he wishes, sedulously avoid any mushrooms except those he has preserved specimens of and may be continually reminded of the appearance and marks of poisonous varieties by consulting the specimens in his possession.

Books

"Mushrooms, Edible, Poisonous, Etc.," Geo. F. Atkinson.

"Mushrooms, Edible and Otherwise," M. E. Hard.

"One Thousand American Fungi," Chas. McIlvaine, and R. K. MacAdam.

"The Mushroom Book," Nina Marshall.

"Edible Mushrooms of Ontario," Bulletin Ontario Agricultural College. R. E. Stone.

"Guide to the Mushrooms," Emma L. T. Cole, Doubleday, Page & Co., N.Y., price $1.50.

How to Know the Birds

By W. E. Saunders, Ornithologist, London, Ont.

BIRD life is attractive to every boy and no other hobby is more beneficial in its results. Even if it is followed casually, so that the total number of one's bird acquaintances amounts to perhaps twenty, zest and interest is added to every walk in country or city and one is constantly renewing acquaintance with his feathered friends; and if, on the other hand, the hobby is pursued with enthusiasm, interest grows with the pursuit.

We all know that the bird is an animal that wears feathers, flies in the air, builds nests, lays eggs; but

have you tried to learn anything of the details of the life of these interesting creatures? Do you know what birds prefer to fly, what birds prefer to walk, what birds prefer to swim? Do you know what birds fasten their nests to frail twigs, which ones use larger limbs and crotches, and those using nesting sites around buildings or holes in trees? What birds nest on the ground, and which in holes in the ground? The number of questions that might be asked about these and similar phases of bird life is great, but your interest will be greater if you try to answer questions put by yourself and you will not be able to ask these questions until you have started to make the acquaintance of some birds.

There are several easy and practical methods of getting acquainted with the birds at short range, any one of which may be used as a start. The easiest, perhaps, is the providing of nesting places. Providing food and drink is another method which leads to good results. In the summer time it is difficult to provide appropriate food for most birds, but greater numbers of them are attracted by water, which may be offered to them in various containers, from a simple pan laid on the ground, to an elaborate stone or concrete basin. It is also possible to get an intimate acquaintance with some birds by taking advantage of their nesting time to approach and make friends, but this is more difficult and takes much more time than inviting the birds to make friends with you. The great advantage of the latter method is that it may be pursued at your home and thus the birds are under constant observation.

The number of species that can be induced to nest in places made by human hands is small. The species most easily attracted is doubtless the house wren (Fig. 7) whose bubbling song and familiarly inquisitive manner makes him perhaps the most welcome of all the summer sojourners. Wrens will nest in almost any sort of a cavity if they happen to fancy it, but in providing nesting sites for these wild things it is better to approach nature as nearly as possible. Offer them a cavity nearly like the ones which have been used by their kind for hundreds of years, namely, the woodpecker hole. This is not a simple cylindrical hole in a piece of wood, but is shaped as shown, (Fig. 1).

Fig. 1. The Woodpecker Hole

The natural excavation is here compared with that made by the best manufacturers, but it can be pretty well duplicated by splitting a short log and fastening the halves together after the hole is completed. Such houses, when placed in favorable situations, may attract not only the house wren but the flicker (Fig. 8), woodpecker (Fig. 4), blue bird (Fig. 9), tree swallow, crested fly catcher, chickadee (Fig. 6) and nuthatch, and while the first two species do not seem to be much attracted by any cavity except the standard natural one, those mentioned later may be induced to nest in almost any sort of a box.

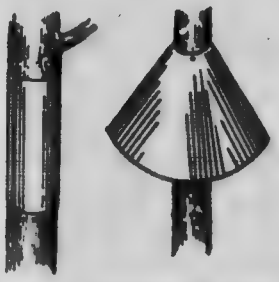


Fig. 2. Protecting the Bird House from Cats

Fig. 3. Blue Jay

It seems to be more within the reach of the human being to make friends with these holes nesting birds than with a great many others, and that is a good reason for endeavoring to begin with birds of that type. Once a pair of birds is induced to nest in your garden, or around your home, the intimacy of your acquaintance with them is limited only by the amount of time you can spend with them.

Fig. 4. Downy Woodpecker Inspecting the House

Some other species of birds may be induced to nest on shelves put up for the purpose. These comprise the robin (Fig. 5), phoebe, barn swallow, bronzed grackle, but the latter, with the cow bird and the blue-jay (Fig. 3), are not good subjects for encouragement. They accept your *efforts to lessen bird numbers* by eating nestlings and eggs and it is a usual occurrence to find that where these predacious birds are encouraged smaller and more useful birds diminish.

A little book by Samuel B. Ladd "How to Make Friends with the Birds" may be studied for additional information along this line.

Classification

As soon as you have made the acquaintance of even a few kinds of birds it is time to learn what families they belong to, for the reason that the habits of different species of a family are more or less alike. The robin, for instance,

Fig. 5. Robin Nesting on the Bird Shelf

belonging to the thrush family has habits which resemble to a considerable extent those of the hermit, wood and other thrushes. The habits of the song sparrow bear a close resemblance to those of other sparrows. The habits of the warblers, flycatchers, etc., bear close relation to each other, and as habits are often a strong clue to the identity of a bird a knowledge of their relationship will be a valuable aid to identification.

Color is, of course, the usual [clue] with which a bird's identity is [found] out, but habits are more instructive and interesting and should be studied as much as possible.

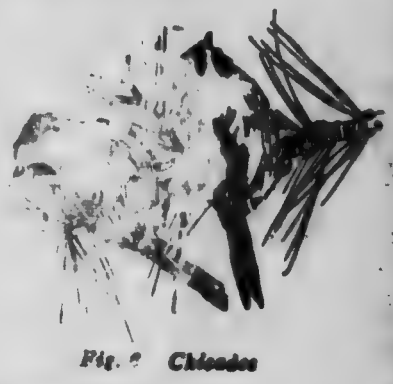


Fig. 2. Chipping

Bill

The most prominent point of resemblance in the different families of birds is the bill. The bill is the means of obtaining food and, therefore, it follows that the bill must carry a certain resemblance. Such families as woodpeckers, flycatchers, sparrows are good examples of families in which the bill is a real trademark, showing both occupation and relationship.

Color Variation

One phase of bird life which is very attractive and interesting to the beginner is the variation of coloring between the male and female birds. These variations are not confined to any special families, nor do they occur consistently throughout most, but very few families of birds fail to show such

Fig. 3. Wren

Fig. 8. The Pitcher of the Woodpecker Hole Bird House

variations. Sometimes the differences are trivial and often the male and female are so different that one would scarcely take them to belong to the same race. As a general rule it may be stated that those species which show the most brilliant colors show the greatest difference between the sexes.

Examples are the oriole, tanager, indigo bird, cardinal, bluebird, grosbeak, goldfinch and others.

Migrations

Birds, like human beings, have a home. It is the place where they return year after year to rear their young. The instinct for migration is developed to a wonderful extent. Set a boy down at Hamilton and tell him to walk to Guelph and he must ask his way many times, but the tiny humming-bird finds his way from Lake Superior across the Gulf of Mexico, and returns with no guide but that of instinct, which sense, it may be so called, is nearly dormant in human beings.

Fig. 9. Bluebird

Nest Construction

One of the most interesting departments of bird study is the investigation of nest construction. After the young birds have flown, the nest may be taken and carefully picked to pieces, the pieces laid together in sorted piles and eventually counted. The

individuality of birds may thus be studied and if it should be possible to investigate the character of two or more nests made by one bird, the comparison may demonstrate the settled nature of the individual.

Big Birds

Every one ought to feel that in our birds, especially the larger ones, all the people have a common interest and proprietorship and it is the privilege of no one to kill wastefully or for display of prowess, any bird which belongs to the whole nation. The larger the bird, the more widespread is the interest taken in it by the general public and it must be regretfully stated that the larger the bird, the greater seems to be the impulse, on the part of a certain class of sportsmen, to kill it.

What feature could add so much to the interest of our waterways, for example, than the presence of numbers of fish hawks, herons and eagles, and the protection that they need depends largely upon the backing they receive from public sentiment. Every right-feeling boy will give his influence to the protection of these birds that need it so sorely.

Books On Bird Life

"Bird Guides for Both Land and Water Birds," by Reed.

"Birds of Eastern Canada," published by the King's Printer, Ottawa, price 50 cents.

"Colored Studies of Wild Birds in Their Homes," Reed. Musson Book Co., Toronto.

"How to Protect Birds," by Ladd. Musson Book Co., Toronto.

"Birds of Village and Field," by Marriam.

"Birds of New England," by Hoffman.

"Bird Lore," a monthly magazine published in Harrisburg, Pa., $1.50. This magazine is worthy of every boy who becomes more than casually interested in birds.

Canadian Native Trees

By R. H. Campbell,
Director of Forestry, Forestry Branch,
Department of the Interior, Ottawa.

WHEN our forefathers came to Canada the whole country except the prairies was covered with great trees and in the history of our country there is many a tale of adventure in the trackless forest. The pioneer, by hard and patient work, built his home and his furniture from the forest, made from it the mortar and pestle with which he pounded his grain into meal and in ways innumerable found in it the things that he needed.

Of the natural resources of Canada from which comes much of the material to supply our mills and factories, the forest is one of the most important. To-day we are using the forests more largely than ever. From them we get, every year, products worth about $180,000,000, including lumber, fuel, posts, poles, railway ties, pulpwood, mine timbers, and the paper for newspapers. *We sell to other countries about $40,000,000 worth.* More people are employed in the forest industries than in any of the other groups of industries in the country.

But the forests do more than supply wood. You have heard with pleasure on a hot summer day the music of the rippling stream as it hurries its waters along in the shade of the woods. Many such a stream has been dried up from its source when the trees have been cut away and their protection withdrawn. The cooling shade of the trees, the soft cover-

ing of leaves on the ground, the varied obstructions of trees and forest plants, the tree roots leading the rainfall deep into the soil, help to hold back the water and to keep up the steady flow of the streams. When the trees are cleared the waters rushing down in torrents leave the stream beds dry and bare. Frequently much good agricultural land is washed away by such torrents. As a constant flow of water is necessary for the water supply of cities and towns, for water power and for many other purposes, it is important that the sources of the streams should be well protected by forests.

White Spruce

How did the forest come into existence? How long has it been growing and getting ready for us? You may find a certain record at the end of a log or the top of a stump where you will see a number of narrow rings, small in diameter, at the centre of the tree, but each one outward getting larger till the bark is reached. Each ring represents a year's growth. Some rings are very narrow and show a bad season or that the tree was in some unfavorable condition for growth. Some rings are large and show that the tree was growing vigorously. Sometimes a fire scar or other wound reveals the dangers through which the tree has passed.

The trees that are now being cut in Canada are generally not less than 100 years old, some are 150 years, some 200, some older. The largest and oldest trees in Canada are found in British Columbia, and attain a diameter up to 12 feet *or more* and a height of 200 feet. But even these are eclipsed by the great trees of California, the largest and oldest in the world. The largest of these sequoia trees now standing is the Grizzly Giant which is 93 feet in circumference at the base. Some of its branches are fully six feet in diameter. The top of this tree has been broken

off so that its height is only 204 feet, but trees are found over 300 feet high. Such trees are as much as 4000 years old. Think back in the history of the world of how many things these old veterans could tell us of ages long gone by if they had memory and a voice.

They had their beginning many years ago when a seed floated down one day and settled on the ground, put its small root into the earth and lifted its tiny head in the air. A little thing a foot might have crushed, it bravely fought its way up, year by year adding to its bulk and strength, till now it stands a veteran giant of the forest. With axe or fire we may destroy such a tree in a few hours, but it cannot be replaced except by following the same process as before. *We are the heirs of all the ages. Do we know how to use our inheritance?*

White Spruce

How are forests destroyed? By fires, lumbering, insects, fungi, storms and floods.

Fires have destroyed much more of our forests, probably ten times more, than have been used for any good purpose. Not more than *one-quarter or one-third* of the forest land in Canada bears mature forest, the remainder having been recently burned or being in various stages of recovery from the effects of fire. The fire in Miramichi, N.B., in 1825, burned over 2,500,000 acres and caused the loss of 160 lives. The Fernie fire in B.C., in 1909, burned the town, a large area of forest and caused the loss of 22 lives. The fires in Northern Ontario in 1916 burned over many miles of territory, caused a loss of 264 lives and of property worth over $2,000,000.

The annual loss by forest fires in Canada averages about $5,000,000. Somebody throws a lighted match or leaves a camp fire burning *and no one knows what the end will be.* Any person who has not learned to thoroughly extinguish match and fire is a tenderfoot, too utterly irresponsible to be allowed

in the forest at all. Fires are also caused by settlers clearing lands, by railways, and by lightning.

Can forest fires be prevented or stopped? They can be prevented almost entirely when everybody becomes careful. They can be stopped except when high winds are blowing and the fire travels too quickly, or gets too wide-spread. How is it done? By arranging to see fires quickly, to send word about them quickly, to get help to them quickly. So towers are built or a lookout post is arranged on a high hill or tree so that the smoke of a fire can be seen immediately. Telephone lines are built, roads and trails are cut through the forest so that it is easy to get to any part of it. Pack horses, wagons and automobiles bring equipment and supplies for the fire fighters. The forest and fire rangers look after this work. Perhaps soon we shall have aeroplanes locating fires.

Cutting trees for lumber does not necessarily destroy the forest any more than using the vegetables destroys the garden. But the cutting must be done so that at least some trees of the best type will be left to scatter seed. Young trees must not be crowded out or be too heavily shaded to get a chance to grow. The work of the forester is to see that the forest is improved and not destroyed by cutting.

The forester must study the habits of the trees, how they affect one another and the effect of light and shade. In Europe the foresters have been so efficient that they have much more and better timber than when they started and yet have been using it all the time. Canada, though such a great forest country, has only made a beginning at scientific forestry. The Dominion and the Provincial Governments, as well as some lumber companies, are now making wide use of foresters.

Insects destroy large areas of forests. The larch sawfly which, starting in 1889, gradually destroyed the tamarack trees all across Canada reached Manitoba and Saskatchewan in 1912 and 1913. Fungi, such as the shelf fungus, which you see on old trees in the wood, will often cause damage.

Sitka Spruce

For the training of foresters, there are now forest schools at the Universities of Toronto, New Brunswick and Laval, which teach surveying, forest botany, forest management, silviculture (which has a similar meaning for the woods to what scientific agriculture has for the farm) and other subjects related to the forest. The profession of forester has many attractions; it gives opportunity for outdoor life, the study of nature and requires scientific study which keeps the mind active and alert. It may not lead to riches, but it will lead to public service, to duty accomplished and to physical health and contentment.

Classification

Trees are divided into two great classes, those having needle-like leaves and bearing their seeds in cones which are called needle-leaved or coniferous (cone bearing) trees, and those having broad leaves that fall in the autumn and which are called broad leaved or deciduous (falling) trees.

The coniferous trees include the pines, spruces, firs, cedar and other similar trees. Their leaves, except in the case of the larch or tamarack, remain on the trees throughout the winter. The cones growing among the leaves are made up of scales under which the seeds are formed. The cones and seed may take two or three years to mature.

The number of species in Canada is about 120, but in most districts the number is not so large that it is a difficult matter to become acquainted with them. Trees may be identified by their general form or by their buds, leaves, bark, flowers or fruit.

Leaves are usually the first thing looked at, but in winter buds and bark must also be studied. Trees of a particular species have a general form which is often sufficient to identify them even at a distance. It should be remembered however, that the tree forms will vary with soil and climate. The tree grown in the open field will have a different shape from that in the close forest and the tree high on the mountain or in the far north will not look the same as one grown at a low elevation or in the south.

THE CONIFERS, OR NEEDLE-LEAVED TREES

The Pines

NINE species in Canada, three in the east, four in the west, and one crossing the whole of Canada to British Columbia. There are two groups; soft or white pines with leaves in bundles of fives and cones hanging downward and with thin scales; and hard pines with leaves in bundles of two or three and cone scales thick and woody. The white pine of the east was used for many years in the building of houses. The bark is dark and rough and the wood almost white. It is the only eastern pine with five needles in a bundle. The western white pine found in British Columbia is a different species having larger cones.

The red pine has long leaves, two in a bundle, reddish bark and wood and is not found west of S.E. Manitoba. The western yellow pine of British Columbia has long leaves in clusters of threes, or occasionally twos, and reddish bark. Jack Pine grows all across Canada into Alberta where it is finally replaced by lodgepole pine. Both have short leaves in bundles of twos, and cones small and curved. The foliage of the lodgepole pine is darker and the leaves not scattered along the twigs so much as in the eastern jackpine. *More jackpine is used for railway ties than any other tree.*

The Spruces—Five Species

More spruce is cut in Canada than any other species. It has the first place in the making of pulp and paper. The leaves are short and generally arranged all round the twigs, at any rate they do not spread flat like the leaves of balsam, fir and hemlock. The white spruce extends from the Atlantic to the Yukon but does not reach the Pacific Coast. The leaves are sharp-pointed and have a peculiar skunk-like odor when crushed. Its cones are from one and a-half

Douglas Fir

to two inches long. The Engelmann spruce (very similar to the white) is found in Alberta, British Columbia and the Yukon. The black spruce grows from the Atlantic to the Yukon and is found in low, wet places. Its leaves are short and blunt pointed, the cone scales have a toothed margin and the end twigs are slightly coated with a rusty-colored hair. Red spruce does not occur west of the eastern part of Quebec. Sitka spruce, found only in British Columbia is the large spruce of the coast. The leaves are stiff, thick and sharp-pointed.

Fir

There are five species in Canada, but one of these, the Douglas fir of British Columbia, is not a true fir. The other four are called balsam fir. The leaves flat and blunt-pointed are spread out from opposite sides of the twigs. The cones stand erect and the scales of the cones are shed at the same time as the seed leaving the stem standing bare. The bark is smooth, but with the *characteristic* blisters filled with balsam. The eastern balsam fir is found from the Atlantic to the Yukon. There are two balsam firs in British Columbia, growing generally at low levels — the lowland fir with yellowish-greenish cones and the amabilis fir, with purple cones. The Alpine fir, is found at higher elevations and has purple cones. Balsam fir timber is used as lumber and pulpwood.

Tamarack

The Douglas fir found in British Columbia and Alberta resembles the balsam fir in the earlier years of its growth, but later the bark becomes very thick and deep furrowed. The cones hang down instead of standing erect as in the balsam fir and have conspicuous three-pointed bracts attached to the back of the cone scales. The trees grow to enormous size and the timber is one of the most valuable in Canada. It is used for the heavy framework of buildings and cars, for bridges, docks, interior finish, paving blocks, wooden pipes, railway ties and many other purposes.

Hemlocks

Have two-ranked flat leaves like the balsam firs, but the leaves are generally smaller and have a distinct small stem. The bark is rough. The cones are very small and hang downward. The eastern hemlock is found from Nova Scotia to Western Ontario. The wood is poor but is used for lumber and ties. There are two hemlocks in British Columbia, western and mountain. Tannin used in tanning leather

is obtained from the bark of the hemlock and nu[illegible]es have been cut down simply to get the bark for thi[illegible]se.

The Larches (Tamarack)

The only species of coniferous trees which shed all their leaves in the fall. The soft leaves are borne in clusters of about twelve to forty at the end of short knobs standing out from the twigs. The eastern larch, tamarack, or hack-matack, is found from Labrador to the Rocky Mountains. The western larch is found in southern British Columbia and Alberta and the Alpine larch is in the same districts but high up in the mountains. The wood is hard and durable and is used for structural timbers and railway ties.

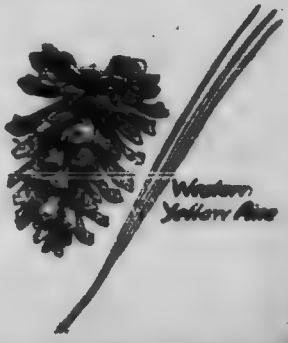
The Cedars

Two species in Canada, one growing from the Atlantic to Manitoba, and the other confined to British Columbia. The bark is thin and shreds in strips and the foliage consists of tiny, over-lapping, scale-like evergreen leaves. The cones are very small. Cedar wood is light and durable and is used in building, making canoes, for shingles, poles, posts and railway ties. The yellow cedar of British Columbia belongs to a different genus and is frequently called cypress. The cones are not so narrow and elongated as those of the other cedars, and the wood is harder and heavier and has not the same *characteristic* odor.

HARDWOODS

The Maples

The maple leaf is the symbol of Canada and the tree is well known. There are nine species in Canada but they can all be distinguished from other species of trees by the shape of the leaf which has three to five pointed lobes. In Ontario and eastward the three chief species are the hard or sugar maple, the soft or red maple and the silver or white maple.



The leaf of the hard maple has five lobes and the edge of the leaf is entire, that is, it is not broken

up into fine teeth. In the leaf of the red maple the two lower lobes nearest the stem are small and the edge of the leaf is cut into teeth like a saw. The leaf of the silver maple is much like that of the red maple, but the notches between the lobes are narrower and come to a sharp point.

In the prairie provinces the only maple growing naturally is the Manitoba or ash-leaved maple. Some of the leaflets are shaped like those of the maple and some resemble those of the ash, and the leaf is compound, as explained under walnut. In British Columbia there are the large-leaved maple with leaves somewhat like those of the hard maple, but much larger, and the vine maple, a small tree growing under the shelter of others and with leaves somewhat circular and having seven to nine sharp-pointed, sharp-toothed lobes. Maple wood is used for flooring and furniture. The wood with the peculiar figures called bird's eye is particularly handsome. Maple Sugar is made from the sap of the hard maple.

The Oaks

Twelve species of oaks in Canada, most of them being confined to the south-western part of Ontario. The oaks are distinguished by their leaves, longer than broad, divided into several lobes, and by the acorns borne in cups. The oaks are divided into two main groups; the white oaks, with rounded lobes on the leaves and sweet acorns; and the black oaks (which include the red oaks) with the lobes of the leaves pointed and bristle-tipped and with bitter acorns.

The typical white oak which grows in southern Ontario and Quebec has leaves from five to nine inches long and three to four inches wide, the lobes are rounded or blunt and the notches are fairly deep, most of them one-half inch and over. The most widely distributed of the white oaks or any of the oaks is the burr or mossy cup oak, which is found from Nova Scotia to Manitoba, and considerably farther north than any other oaks. The leaves vary greatly in size and outline but their characteristics are well marked. The long deep notches in the leaf on each side of the main rib which almost meet and cut the leaf in two are a good distinguishing feature. The acorns are large and the scales on the edge of the cup are elongated and form a distinct fringe. The Garry oak is found only in British Columbia and is the only oak there. Its leaves are like those of the white oak. The chestnut oak is found only in the

extreme south western part of Ontario. The leaves resemble those of the chestnut tree but the points on the margin are more rounded and the outline wavy rather than toothed.

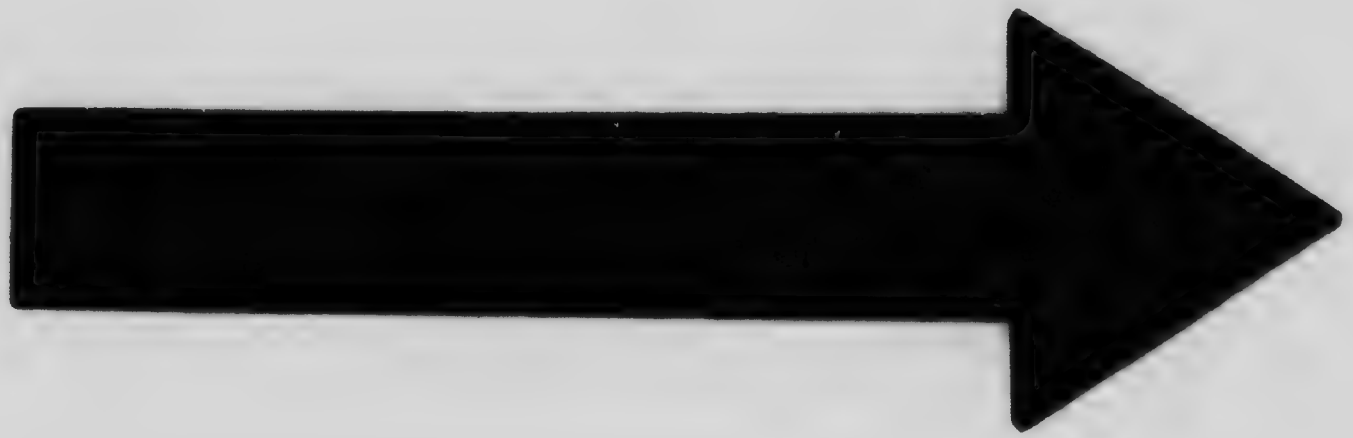
Of the black oaks the one generally known as the red oak is the most widely distributed. It is found from Nova Scotia to the east shore of Lake Superior, and as far north as the height of land between the Great Lakes and James Bay. The leaves from nine to thirteen lobes which taper to a sharp point and the bark is generally smooth. The scarlet oak, black oak and pin oak occur in south-western Ontario. The lobes of the leaves are bristle-pointed and the bark rougher than that of the red oak. The white oak, now very scarce, is the most valuable species and the wood is used for making furniture, for flooring and for barrels, and casks.

The Walnuts

Only two species are found in Canada, the black walnut and the white walnut or butternut. The leaves are compound, that is, there are a number of leaflets on each stem. The nut is enclosed in a round, green covering about the size of a small apple. The black walnut, unfortunately very scarce, is one of our most valuable trees. It grows naturally only in south-western Ontario and is found scattered on farms. The wood is hard, dark in color, is used for making aeroplanes, furniture, cases for organs and pianos, and gun-stocks. The white walnut or butternut may be distinguished from the black walnut by the twigs which are downy and clammy. The nut is longer than broad. The butternut is found from New Brunswick to Georgian Bay in Ontario. The wood is soft and light in color as compared with the black walnut and is used for planking in boats and for interior finish.

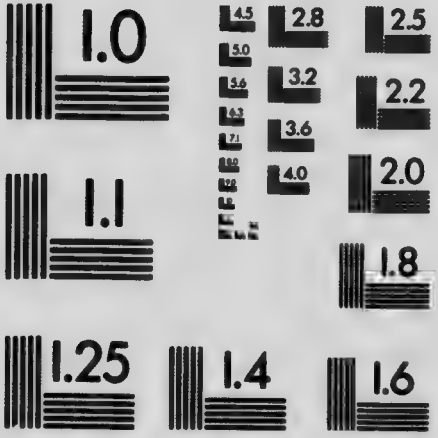
The Hickories

Six species appear in Canada, but none of them found west of Ontario. They are related to the walnuts and like them have compound leaves, though smaller, and smaller nuts, The bitternut hickory is one of the most generally distributed. Its bark is gray and rough, new shoots are an orange green color and dotted and the nut is bitter. Its winter buds are sulphur yellow in color. The shagbark hickory is named and distinguished by its bark flaking or shagging loose in plates which are free at both ends and by its sweet nuts. The wood, among the toughest strongest, and hardest in Canada, is used chiefly for vehicles, tool handles, agricultural implements, machinery parts and sporting goods.



MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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The Ashes

Four species are found in Canada. The leaves are compound and each pair are placed immediately opposite to one another on the branches, unlike those of the walnut or hickory and its fruit is a winged seed. The white ash, the most valuable, is found growing from Nova Scotia to south-western Ontario. The twigs are coarse, and shiny, and the leaflets have stems.

The red ash is a smaller tree and has downy twigs. The black ash has all but the terminal leaflet stemless. The green ash, a variety of the red ash, is found from western Quebec to Alberta. It differs from the red ash mainly in the smoothness of its branches, leaves and stems. The blue ash is confined to the counties bordering on Lakes Erie and St. Clair, but is not very common even there. It may be distinguished by its rather heavy branchlets which *are more or less four-sided in cross-section*. The wood of the ashes is noted for its toughness and elasticity. The more valuable species, particularly the white ash, are used for vehicle stock, tool handles, and interior finish. The mountain ash is not a true ash and is distinguished by its numerous small, toothed leaflets and its red berries.

The Elms

Three species are native to Canada. The leaves are not compound. The veins run off from the midrib to the outer edge like the barbs of a feather. The white elm is the common one with a great spreading top seen standing so grandly in meadows. The twigs are smooth. The rock elm has corky ridges on the twigs which easily distinguish it. The red or slippery elm has stouter twigs than the white elm and they and the inner bark are *mucilaginous*. The buds have a heavy covering of reddish brown hair. The rock and red elms are found only in the southern part of Quebec and Ontario, but the white elm goes as far west as the province of Saskatchewan. Elm is used for making furniture, but principally for barrels, boxes and fruit packages.

The Birches

The birch bark canoe of the Indian has made the birch well known in Canadian song and story. The bark of our nine birches which is smooth and in color either brown or white, is marked with long horizontal slits and on young trees of most species can be separated into papery layers. The seeds are produced in small, scaly cones. The leaves are simple and

pinnate. There are two white birches, so called from the color of their bark, one the well-known paper or canoe birch, which grows to a large tree and is found from the Atlantic to the Pacific. The white birch, a smaller tree, is found in the Maritime Provinces and westward to eastern Ontario. The leaves are triangular in outline with a long tapering point.

The yellow birch is found from the Atlantic to Lake of the Woods and is the largest birch in Canada. Its name comes from its yellowish, straw-colored bark. Cherry, or sweet birch, which comes into Canada only at a few places in southern Ontario and Quebec, has darker bark which is sweet and aromatic. Western birch, which is a large tree and has brown bark, is found in south western British Columbia. Two smaller birches, the Alaska and Mountain birches, are found from Saskatchewan westward.

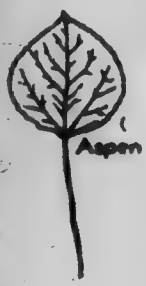
The wood of the larger birches is used for making furniture, interior finish and veneers and of the white birches for spools, bobbins, clothes pins and small woodenware.

The Cherries

Three species appear in eastern Canada, the black, red, and choke cherries. The black cherry is the largest tree with long, narrow leaves having fine teeth, and dark fruit. The red cherry is a smaller tree and has red fruit and lighter bark. The choke cherry has dark bark and rather broad and blunt leaves. It does not grow as tall as the others. The fruit is dark-colored with peculiar astringent properties which cause the "choking" sensation after eating it. A western choke cherry is found on the coast of British Columbia and on Vancouver Island. There is another cherry in British Columbia, the bitter cherry, which has dark, bitter fruit. The twigs are bright red as contrasted with the light brown of the choke cherry.

The Poplars

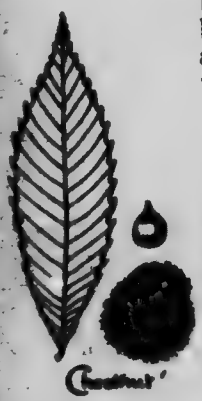
The poplar is distributed all over Canada and there are seven species that are native. The aspen poplar, distinguished by its almost circular, fine-toothed leaves which on account of the flattening of the stems *laterally* tremble in the slightest breeze, is the most widely distributed. The large toothed aspen, with larger leaves more coarsely toothed, is



not found west of Ontario. The balsam poplar, with larger, pointed leaves and buds covered with a sticky gum, is almost as widely distributed as the aspen poplar. The cottonwood having broad leaves with square base, triangular in outline and coarsely toothed, is found scattered in river bottoms in the southern part of both eastern and western Canada. There are two poplars with long narrow leaves in southern Alberta and Saskatchewan. The black cottonwood on the coast of British Columbia has leaves like the balsam poplar. Poplar wood is not very valuable and is used for fuel, for making excelsior, pulp and lumber. The Lombardy poplar a tall, narrow tree, and the silver poplar with leaves shaped like those of the maple, green and shiny on top and white and woolly beneath, have been introduced from foreign countries.

The Beech

Only one species of beech found in Canada and it grows from Nova Scotia to Lake Superior. It is readily recognized by its three-angled nuts, in a spiny covering, its smooth, gray bark, and the long-pointed lance-shaped buds. The leaves are simple, pinnate, and coarsely toothed. The wood is used for flooring, furniture, etc.



The Chestnut

The chestnut of southern Ontario is now very scarce. A disease which came over from Europe, the chestnut tree blight, is fast destroying what are left. The leaves are simple, six to eight inches long and the margin coarsely toothed with curved teeth like those of a circular saw. The nuts are enclosed in large burs. The wood is mainly used for veneer cores, pianos and doors. The horse chestnut is a different species and is not native to Canada.

The Basswood

The basswood is found from the Atlantic Coast westward to southern Manitoba. It is easily distinguished in the summer by its large heart-shaped leaves, yellow flowers and round, hard fruit about the size of peas. The dark red, sometimes green, smooth lopsided or "hump-backed" buds are one of the tree's best distinguishing features in the winter. The wood is light, of fine texture and is used in cooperage, box making, canoes and for panelling carriages.

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"The Trees and the Shrubs of North Eastern America," by C. S. Newhall. C. P. Putnam and Sons, New York.

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Getting Acquainted With the Stars

By Taylor Statten,

National Boys' Work Secretary, National Council of Young Men's Christian Associations.

ALTHOUGH born and brought up in the open country where the gaze of the starry heavens is undimmed by the blinding lights of the city streets, I never learned to distinguish one star from another. I was a disinterested n ember of the great audience before which is staged each evening the most wonderful of all spectacles. Some there are who have eyes, but see not!

In this, I was like many another country boy. It was not until after I had been living in the city for some time and was privileged to return again

to God's great out-of-doors that the charm of the sparkling fires of space was revealed to me.

Let me tell you how it happened. We were on a canoe trip through Temagami. One of our party was an accomplished watcher of the skies. Although an amateur, he had recently made a trip to Labrador with some professional astronomers. One evening as we sat on the shore of an island in Lake Temagami, he pointed out some of the stars and constellations and held us fascinated as he unfolded the mysteries of the worlds beyond. Although I soon forgot many of the interesting things he told us, my interest in stars was rooted and each year I have been adding a little to my stock of star knowledge.

Last summer while in Algonquin Park with a party which was organized as a band of Woodcraft Indians, we tried the tests for the knowledge of stars and I discovered much to my surprise that I could qualify for a Grand Coup and Star Wise Man's Honors.

While visiting the various boys camps, I have found considerable pleasure in inspiring a few boys to commence star gazing. I trust that the interest planted that night on Lake Temagami may bear much fruit.

The first thing I learned was to locate the North Star. I was told that it was the one star in the sky that apparently did not move. Among other things I learned on that first trip which I have never forgotten was the fact that the two stars at the lip of the Big Dipper always points toward the North Star and appear to revolve completely around it every twenty-four hours. We were shown how to tell the time by trying to picture a big clock in the sky with twenty-four hours marked on the dial instead of twelve and numbering to the left, rather than to the right. The pointers

of the Dipper are the hour hand. We tried it and soon discovered that we could tell the time with fair accuracy.

I have never forgotten the "Little Papoose" on the "Old Squaw's" back. The Old Squaw, "Mizar" is the second last star in the handle of the Dipper and the Little Papoose, "Alcor," is just above and apparently almost touching it. An Indian test for good eyesight is to be able to see the Little Papoose.

It would have been difficult to forget the constellation that looks like a broken-down "W," which was supposed by the ancients to be a beautiful lady sitting in a chair. I must confess that although I can always see the Gibson Girl in the moon, I have never been able to form any conception of the appearance of "Miss Cassiopeia." These old-timers must have been gifted with powerful imaginations. This constellation is to be found about the same distance from the North Star as the Dipper, but always directly opposite.

The other constellations which are not difficult to locate and which are easily remembered are the Northern Crown, the Northern Cross, the Lyre, the Eagle, The Herdsman, Job's Coffin, the Little Bear, Orion, Pegasus and Hercules. These, with the Big Dipper, make a total of thirteen constellations. Although you cannot see all at one time, the majority of them will be visible any clear night, and by keeping up your interest during the entire year you will add a great many more to your list.

I have found real delight on a fine summer night in drifting out on a northern lake in a canoe with a copy of Olcott's "A Field Book of the Stars" and a small electric flashlight. After reading and studying the charts, I would turn off the light and try to locate the stars. I am not given to dreaming, but as I drifted away from shore and

all sounds of life died out upon the earth save the occasional hoot of an owl and the weird call of a loon, I rejoiced to find how friendly and companionable the stars became. At times the silence of the vast and starry heavens almost filled me with terror. Its immensity seemed overwhelming. As my eyes rested first on one star and then another, and I realized that each was a sun, I tried to picture the worlds that were revolving around them and imagine something of the infinite myriads of systems each similar to that which our sun controls.

Before you were born the ray of light you see from the North Star had left that orb. During the first second, it traveled 186,000 miles. In a minute it added 11,000,000 miles and so on for 36½ years it traveled at that great speed before it could reach your eye.

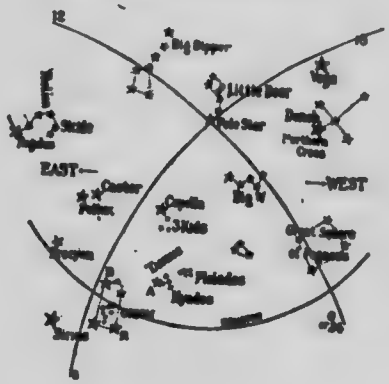
As you gaze on the Milky Way remind yourself that it is a swarm of stars and every star a sun; that our sun is as one of the stars in the Milky Way; that it only takes the light from our sun 8 min. 17 sec. to reach the earth, but that it would take a cannon ball, shot from the sun to the earth 10 years to strike us and an express train, traveling without a stop, about 200 years.

Although there are about 7,000 stars visible to the naked eye, we see only about 3,000 at one time. The most powerful telescope reveals more than 120,000,000 stars. The universe is infinite, space is limitless, with innumerable worlds whose inhabitants in all probability think of us as we try to think of them. I confess that I derive great satisfaction in meditating in this way on infinity and with Flammarion I can say that "nothing stimulates my faith in God more than a few hours of the silence and peace of a bewitching night, contemplating, admiring, spelling out the words of the great Book of the Heavens."

Every Canadian boy should make the following stars his friends:

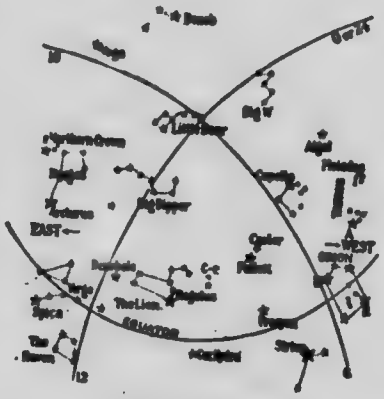
1. ARC-TU-RUS.—Situated in the left knee of the Herdsman (Bootes). It is at its highest point in the heavens on June 8th.

THE SKY IN WINTER



The 0 to 6 Quarter.
Line 0 is overhead about November 22nd. Line 6 is overhead about January 21st.

THE SKY IN SPRING



The 6 to 12 Quarter.
Line 6 is overhead about the 1st of February. Line 12 is overhead about May 6th.

2. VEGA (the Falling Bird or Harp Star).—In the Lyre Constellation. It is directly overhead on August 10th.

3. AL-TAIR.—In the Eagle (Aquilla) constellation, located in the neck of the Eagle. It reaches its highest point in the heavens on September 1st.

4. DENEB (the Hen's Tail).—To be found at the top of the Northern Cross or the Tail of the Swan.

5. PO-LA-RIS.—The North Pole Star.

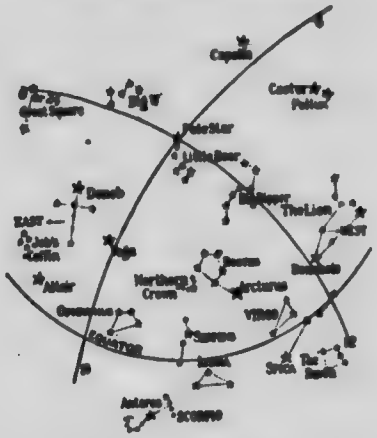
6. MIZAR.—The second last star in the handle of the Big Dipper.

7. ALCOR.—Located close to Mizar.

8. CAPH.—The hand of Cassopeia, the Lady in the Chair. Caph is equi-distant from the Pole Star and exactly opposite Megres in the Big Dipper.

9. GEMMA.—The brightest star in the Northern Crown.

THE SKY IN SUMMER



The 12 to 18 Quarter.

Line 12 is overhead on April 28th. Line 18 is overhead on July 28th.

THE SKY IN AUTUMN

The 18 to 24 Quarter.

Line 18 is overhead on August 28nd. Line 0 or 24 is overhead on November 28nd.

10. AL-BI-REO.—The base of the Northern Cross.

11. SADR.—The centre of the Northern Cross.

12. SIR-E-US.—Situated in the mouth of the Great Dog. It reaches its highest point in the heavens on February 11th.

13. RIGEL.—In Orion. The left leg of the Giant. It reaches its highest point in the sky June 20th.

14. POLLUX.—Located in the head of Pollux in the Twins (Gemini) Constellation.

15. CASTOR.—Located in the head of Castor in the Twins (Gemini) Constellation. It reaches its highest point in the heavens February 23rd.

By the aid of the charts in this Manual, it will not be difficult to locate the following constellations:

1. URSA MAJOR (ersa ma-jor).—The Great Bear. This is the best known of the constellations. It is familiarly called the Big Dipper, sometimes known as the Plough.

2. URSA MINOR (er-sa mi-nor).—The Little Bear. The North Star is in the tip of the tail of the Little Bear or the end of the handle of the Little Dipper, if you prefer to think of this constellation as such. Each of the four stars in the bowl of the Little Dipper are of a different magnitude—the brightest one is a second magnitude star and the dimmest of the fifth magnitude.

3. CASSIOPEIA (kas-i-o-pe-ya).—The Lady in the Chair. A line drawn from the Big Dipper, through the North Star strikes Cassiopeia. Cassiopeia looks like a broken-down W.

4. TAURUS (ta-rus).—The Bull. This constellation can be easily located because it contains the Pleiades. There is also another V-shaped group of stars known as the Hyades. This is a winter constellation.

5. ORION (o-ri-on).—The Great Hunter. Orion is also a winter constellation and is generally admitted to be the finest constellation in the heavens. Orion was supposed to be a great hunter and when he died, went to heaven. The three stars in his belt are called the Three Kings. Orion was worshiped in China and was known as the White Tiger. The Esquimaux believe that the three stars in the belt are steps cut by one of their saints in a snow-bank to enable him to reach his glory.

6. LYRA (li-ra).—The Lyre. This constellation may be easily located because of Vega—the very bright star in the zenith during July and August. One of the stars in the Little Triangle is a double. If you have good eyesight, you can detect this

with the naked eye. Ordinary opera glasses show the two stars quite clearly. The small telescope in the Observatory at Ottawa shows them about a foot apart and through the larger telescope, you may see another star almost between them.

7. CYGNUS (Sign-nus).—The Swan or the Northern Cross. The Northern Cross is not far from the Lyre constellation and is located in the Milky Way. The Cross is almost a perfect crucifix.

8. AQUILA (ak-wi-la).—The Eagle. In the summer time about half way up the sky in the Milky Way, you will find three stars in a line—the middle one being much brighter than the other two. The brightest star is Altair. This constellation resembles the form of an arrow head.

9. DELPHINUS (del-fi-nus).—The Dolphin. This is another summer constellation. It is of a diamond-shape form and easily recognized. The early Greeks called it the Sacred Fish and by the Arabs it was known as the Riding Camel.

10. SAGITTARIUS (sag-i-ta-ri-us).—The Archer. During the months of July, August and September face the southern sky and locate this constellation by tracing out a Milk Dipper and a Bow and Arrow.

11. CORONA BOREALIS (ko-ro-na bo re-a-lis).—The Northern Crown. Not far from the end of the handle of the Dipper may be found a circle of stars or almost a circle, for it is not complete.

12. HERCULES (her-ku-lez).—The Kneeler. This constellation is immediately to the right of the Northern Crown and occupies the part of the Heavens towards which the Sun is bearing the Earth and the planets of our system at the rate of 43,500 miles an hour.

13. BOOTES (bo-o-tez).—The Herdsman. First locate Arcturus, below and to the right of the Northern Crown. This brilliant star forms the lower end of this kite-shaped constellation which can be easily

traced out by following the chart. Arcturus is 1,000 times the size of our sun and is mentioned in the Book of Job. It is often called the star of Job.

14. PEGASUS (peg-a-sus).—The Winged Horse. TUXIS BOYS should be able to locate this constellation. It is known as the Great Square. It is found by drawing a line from the North Star to Cassiopeia and doubling the distance.

There are many splendid books about the stars that are written for beginners. Among the best are:

"A Field Book of the Stars" by Wm. Tyler Olcott, (G. P. Putnam & Sons, Pub.)

"Astronomy for Amateurs" by Camille Flammarion, (D. Appleton & Co. Pub.)

"A Book of the Stars" by R. F. Collins, (D. Appleton & Co. Pub.)

"Around the Year with the Stars" by Garrett P. Service, (Harpers).

The Making of the Earth*

By Cecil L. Brown.

I BELIEVE one of the most fascinating trips that one can take is an imaginary trip away back down the ages of time, away beyond the earliest dawn of human history. This was many millions of years before men began to record historical events on the walls of their caves, on the sides of great pyramids, on bark, on skins, or on paper;

*Scientists are not and perhaps never may be all agreed upon any one of the theories founded upon geological and other facts but many, if not most, will agree in general with this account of the making of the earth.

yes, millions of years before men were ever on this earth. Yet the rocks and stones of this earth were wonderful historians and some men whom we call geologists, with the help of the rocks and stones, have been able to read the history of the long ages past, and a wonderful history it is. If I were to attempt to tell you the story of it in detail, it would take many large books, so we will discuss it here only very briefly.

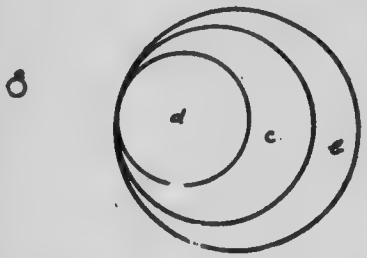


Fig. 1
Illustrating comparative sizes of gaseous stages with present earth.
a. Present Size.
b., c., d. Successive Decreases in Size.

In the beginning God created the heaven and the earth. The earth was without form and unfinished. The writer of Genesis gives us a very true story of the Making of the Earth, but does not describe the process of making it at all in detail. First he says that the earth was without form and void. Now, scientists tell us that this was so, and that God caused the Earth to exist first in a gaseous state. This great amount of gas was very hot. The heat was far greater than any heat that we know at the present time. Water when it is very hot is in the form of a gas which we call water vapor. As the water vapor cools it turns to a liquid called water, and when it gets very cold it turns to a solid called ice. Now any mineral or rock, if heated to a sufficient temperature turns to a molten state and if it is made still hotter it turns to a gaseous state. Thus it is supposed that all the water, minerals and rock that we have in the world to-day were mixed up in an intensely hot gaseous form. The earth then of course would be much larger than now, as we know water expands when it turns to steam, so all of these substances must have taken up more space when in a gaseous state. (Fig. 1).

Imagine a world of this kind, nothing but an immensity of flaming vapor. Then as this gradually began to cool it naturally turned to a liquid form and this world would be just one vast ocean of fiery matter, swung into mid-space by the Creator, sending its lurid glare of fearful light far through the cold intervals of infinite space.

Supposing it were possible for us to have witnessed this wonderful, yet terrible sight, we would very likely have said, "Surely God is making a great mistake, how can any created being ever inhabit or enjoy a world like this?" but God's knowledge is deeper than ours, and in this mass of molten matter He saw order and beauty and the beginnings of a great and beautiful earth.

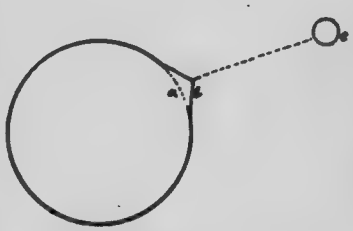


Fig. 8

Illustrating the attractive force of the Moon.

a. Earth.
b. Tidal Wave.
c. Moon.

We must never be hasty and doubt God, because God works slowly and in a developmental manner and He never makes a mistake. When we take an acorn into our hands, we might say, "God can never make a strong and sturdy oak tree out of this," but yet we know He does. He takes a hundred years to do it, but when it is finished it is mighty and strong.

You have all heard of the tidal wave that crosses the ocean every twenty-four hours. This is supposed to be caused by an attractive force exerted by the moon. Now, we have reason to believe that when the earth was in this molten state that the moon would quite naturally cause a wave of this fiery liquid to go clear around the earth every twenty-four hours. As the molten mass cooled, however, a crust, like thin ice forming on water, was formed on the outside of the molten mass, and when the tidal wave came around it shattered this thin crust to fragments. This would take

place till the crust was sufficiently thick to withstand the pulling force exerted by the moon. (Fig. 2).

As ages of time swept on and the earth's crust became stronger and thicker, the water which had heretofore existed in the form of water vapor, gradually began to cool. A scene of terrific sublimity now approaches. As yet no water existed upon the earth. No rain had fallen upon the parched and blackened crust. All the water which now fills the oceans and the rivers and the lakes, all which saturates the atmosphere, and the soil and the rocks—rested then upon the earth as an arid, elastic, invisible vapor, extending an unknown distance into surrounding space. This vapor was not like steam, but intensely hot and invisible. It was like the water vapor just issuing from the exhaust pipe of a steam boiler. The time had now arrived, however, when the remoter regions away from the earth to which this aqueous gas extended began to be so far reduced in temperature as to cause condensation to begin, as the heated water vapor, rushing from the locomotive, soon cools into a cloud of visible mist or steam. If a person could have been present on the earth at this time, he would have seen the dusky atmosphere begin to thicken. In the far-off regions, wisps of vapor crept along the sky as thin dark clouds or cirri. In our day this would denote a gathering storm and so it did in this case. These clouds grew and thickened, and darkened, till a pall of impending clouds enwrapped the earth, and the light of the sun, moon and stars was shut out for a geological age, which probably covered thousands of years.

Particles of cooled vapor drew particles to themselves and the rain drops began to fall towads the warmer strata of air near the earth. But in their descent as they approached the still hot crust of the

earth they were scorched to steam again and, as the meteor's light vanishes in mid-heaven, they disappeared and were sent hurrying back to the bosom of the cloud to be again sent forth as rain and again consumed back into the cloud. At length they got as far as the hot crust, but this seething, hot crust rejected the cool offering and they were driven back to the over-burdened cloud which had an ocean in its bosom to transfer to the earth.

The space between the clouds and the earth was one stupendous scene of ebullition. But the descent of rains and the ascent of vapors disturbed the electricities of the elements. In the midst of this natural yet stupendous contest between fire and water, the voices of heaven's artillery were heard. Lightnings darted through the awful darkness and world convulsing thunders echoed through the universe. Yet all was order and all part of a great plan. The infinite mind of God the Creator saw in the making an earth beautiful which would be a fit abode for all the lower creatures he was to create, as well as men.

Fig. 8

Illustrating formation of earth's crust.

a. Former Mass.
b. Wrinkles, etc., in Shrinkage.

But now the great storm has passed and the waters cover the face of the earth. As the crust cools it shrinks and as it shrinks it wrinkles up in places. Mountain ranges and islands protrude up through the surface of the water.

As this cooling process goes on even continents are heaved up through the surface of the mighty ocean and the water gradually drains off. As this vast ocean we have mentioned washed around the surface of the earth, it caused a great erosion on the rocky crust and a sediment of fine rock gradually was formed and settled on the bottom.

Now, as the islands and continents appeared, shoved up by the earth's shrinkage and covered with this sediment, vegetation sprang up on the land. Then as the water cooled myriads of water animals and fish appeared in the oceans and lakes and ani-

mals roamed the forests which already covered much of the land. The plains were clothed in verdant grass; the trees, bearing fruits and nuts, grew in all the forests; multitudes of fishes filled the lakes and rivers; animals roamed the forests, whose flesh was useful for food, and whose skins were excellent for clothing—when all was ready, God introduced man to the earth which he had prepared for him and gave him dominion over all.

This is only a short story of the making of the earth. It does not stretch back into the unknown eternity. However, we find God to be the firm rock of support from which the chain of existence hangs. He is the "Rock of Ages." We feel strengthened and comforted in knowing that even though our knowledge is very small, even though there are mysteries we cannot explain, there is one thing we know, and that is, "In the beginning God Created."

The Development of Plant Life

By. J. W. Emery, Ph.D.,
Principal, Normal School, Stratford, Ont.

"And the earth brought forth grass and herb yielding seed after his kind and the tree yielding fruit, whose seed was in itself, after his kind; and God saw it that was good."
Genesis 1: 12

THE earth, as most of us see it, is clothed with verdure. Everywhere we see forms of plant life in endless variety, from the towering giants of the forest to the meek flowers of the field and wood. We admire their beauty, we use them for food or fuel and we are kept alive by their ability

to purify the air. So accustomed have we become to the vegetable life about us that we may have been led to think that it has existed unchanged from the beginning of the world; but such is not the case. It is true that Julius Caesar probably saw in Britain a vegetation differing but slightly from that which George V. now looks upon; but the time separating these two men is but a moment compared with the ages that God has used in bringing this earth to the stage at which we see it to-day.

Our study of the "Making of the Earth" has shown us that ages upon ages ago the earth cooled from a fiery, gaseous state to a molten form and from this to solid rock. This rock is of the hardest description, chiefly granite. Land plants require soil and soil is made from the breaking down of rock by such agents as frost, ice, heat and cold, atmospheric action, a sure, but an exceedingly slow process. The only plants to-day that can live on bare rocks are the lichens, so we must suppose that these were among the earliest of the land plants and that they were probably the only plants for a very long period of time. Their remains must have contributed greatly to the formation of a layer of soil so necessary to the growth of the higher plants.

While the earth was being fitted for its crop of vegetation the water "was bringing forth abundantly." It is here, no doubt, that life first appeared, and that in vegetable form. If you look into any stagnant pond or slow-running stream you will see masses of green, slimy-looking material floating about or fastened to the stones at the bottom. Examination under a microscope shows that this is composed of beautiful thread-like plants and among them may be seen some that are branching, others again, of spherical shape. Those—the so-called Algae—are of many species and are the fresh-water representatives of the larger seaweeds found in the ocean. We

have reason to believe that these seaweeds occurred long before any of the land plants.

It may be asked how we can speak so confidently about what grew in those ages long before history was written, before man had yet appeared on earth. We have learned that the first rock formed came from the solidified molten mass; it was granite. After this had cooled sufficiently water was condensed upon it. Imagine the water in the forms of raindrops streams and waves, aided by the atmosphere and the heat and cold, acting through immense periods of time till great layers of fine sediment were spread on the sea floor and compressed into solid rock. Imagine the seaweeds and dead shell fish getting mixed up in this material. Imagine the new rock being elevated till it stood uncovered by the sea. We now have a new kind of rock forming the earth's surface, stratified or sedimentary rock. On breaking this we find the petrified remains of the life that was buried in it—fossil plants and animals. In these stratified rocks we have preserved for us a record of the life that has existed on the earth, somewhat disconnected, it is true, but becoming more and more complete as new links are discovered and the "Footprints of the Creator" brought more clearly to our view by human research.

Now, to return from this digression; the oldest plant fossils we find are those of sea weeds and the first land plant remains occur in rocks separated from them by immense periods of time.

We must digress again here in order to consider briefly the different great classes of plants as we find them to-day. Lowest of all are the Algas and following in order of complexity of structure are the Fungi, Mosses and Ferns. These are the so-called flowerless plants. Above these are the seed bearing plants, first the Conifers or ever-

greens, then those of the palm type including lilies, grains, and grasses and finally the highest forms represented by our hardwood trees and the majority of our flowering shrubs and herbs. By a "low" plant is meant one that has few or no organs, being a homogeneous mass or layer or thread or even a single microscopic cell. The "higher" the plants, the greater the differentiation of parts into root, stem, flower, bark, veins, hairs, each with its peculiar function. It is worthy of note that the oldest rocks contain only the lowly-organized plants, the higher plants appearing in order as the rocks become more recent.

The most interesting of plant remains are in the Carboniferous period. The period during which most of our best coal seams were formed from the profuse vegetation of that time. The forests of this period presented a strange sight. There were no hardwood trees, no evergreens; but tall tree-ferns, and gigantic horsetails, and the scaly trees, the Lepidodendron represented now by the little creeping clubmoss used for Christmas decorations. With a little patience anyone may find traces of these ancient plants in the pieces of black shale commonly seen mixed with the coal.

In the ages that followed the carboniferous, the evergreens appeared. The rock informs us that at one time the great redwoods, now confined to a short strip in the warmer parts of the Pacific Coast were the predominant trees of the North American forests. But conditions changed and they passed away, new types taking their place, first the palms and other tropical or sub-tropical trees and finally the hardwood forests very much like those we see to-day. And so we not only have our earth clothed with an endless variety of plants but these have been getting better and better with the passing ages.

We ought not to suppose, however, that God had to perform a special act of creation as each new plant was needed. It sufficed that He gave that mysterious thing Life and an orderly law of development. Changing conditions were then able to convert by a gradual process (we call it evolution) one form of life into another better adapted to the new environment. Creation is not yet finished.

The Biblical account of the creation is so brief that one might get the impression that all the plants were made in one day just at the speaking of a word and there are many good people who resent the introduction of any other plan as discrediting God's word.

In the foregoing account there is no contradiction of the book of Genesis. Let us be careful not to expect from the Bible that which it was never intended to give us. It is purely a spiritual revelation. In it we find what the human mind, aided by the finest instruments, has been able to discover; God created the earth, the heavens above it and the life upon it. The Bible is not a book of science nor of history; hence, to discover *how* He created these things we must look elsewhere. God has given us eyes, ears, reason, and a second great book, nature. With these senses and this reason He bids us read for ourselves.

There is a book who runs may read;
  Which heavenly truth imparts,
And all the lore its scholars need,—
  Clear eyes and Christian hearts.

The works of God above, below,
  Within us and around,
Are pages in that book to show
  How God Himself is found.

He would be great, indeed, who could bring all the plants of the world into being by a magic word like some great genius of the Arabian Nights. But is He not an infinitely greater God whose days are aeons; who works through all eternity by systematic, orderly, unchanging laws; beneficent when obeyed, but bringing inevitable disaster to the transgressor.

CHAPTER XII

CANADIAN MOUNTAINS AND PARKS

Canada's Mountain World

By Frank Yeigh,
Author of "Through the Heart of Canada"

FEW Canadians realize that Canada is one of the great mountain countries of the world. Fewer realize the immensity of this Alpine region. Estimated in area, it roughly approximates three hundred thousand square miles. A striking comparison is obtained in the area of Switzerland, which is only sixteen thousand square miles. In other words, Switzerland could be placed in the mountain parts of Alberta and British Columbia and still have a wide margin of territory left.

Another way to estimate these towering ranges of the Canadian West is to cross them by rail. There are four routes available for viewing our mountains. The most northerly route, that of the Grand Trunk Pacific Railway, enters the gateway of the Rockies and runs to Prince Rupert on the west. The central route is that of the Canadian Northern Railway.

The two southerly routes are the main line of the Canadian Pacific Railway and the fourth route, the most southerly, through the Crows' Nest Pass and the Kettle Valley in Southern British Columbia. Cutting across the mountains, therefore, from the prairies to the Pacific ocean, sectional views as it were, are had of the four main ranges that run from north to south, the Rockies, the Selkirk, the Gold Range and the Coast Range.

While the distance from east to west is about six hundred miles, that from north to south is as much again or around a thousand miles from the vast untrodden and even unmapped peaks of the far north, where nature exists in all her sublime solitude to the upheaved masses on the south that carry the boundary line between Canada and the United States.

Such is the almost inconceivable extent of this Canadian world of snow-covered mountains, holding within its far-flung borders a wonder realm of scenic grandeur where nature reveals herself in all her varied forms, from the crowning mass of Mount Robson, "A kingly spirit throned among the hills" to the tiniest Alpine flower that raises its color banner at its titanic base. Both are God-made, both tell of His handiwork.

Let us explore these sun-kissed summits that so alluringly beckon one as viewed in panorama from Calgary, their distant peaks outlined against the blue sky in startling silhouette.

The transition from the rolling sea of fertile lands to the rolling sea of mountains—from God's plains to God's hills—is dramatic in the extreme. For hundreds of miles, from north to south, the vast Cordillerean range faces the plateau that stretches to Hudson Bay. A generation ago it might well have been regarded as an impassable barrier be-

tween the prairies and the Pacific Coast, but even the mountains have to yield their supremacy to the railway engineer. As the rivers have cut a way for themselves through the intervening ranges, so the ocean-to-ocean railways on Canadian soil have utilized the river-beds and their valleys for the tracks of steel. From the foothills of the Rockies to the mouth of the Fraser Canyon the trains of the Canadian Pacific Railway twist and turn to the tune the streams have set—along the circuitous Bow, along the turbulent floods of the Kicking Horse, along and across the broad breasted Columbia, along the glacial waters of the Illecillewast, along the blue-green Thompson, until its identity is lost in the yellow Fraser. For six hundred miles the river-banks and beds have provided free right of way for the path of the railway.

As the train thunders on its western course the vanguard of mountains slowly rise to meet the gaze. A storm may rest for a time on the rugged crests of the first range of peaks and then majestically journey northward, exhibiting as it passes an electrical display of terrifying force. Defiantly the locomotive plunges into the Kananaskis Gap and, with the plunge, the world of the plains is forgotten, the Switzerland of hills is entered in the Banff National Park.

High overhead tower the Three Sisters and Wind Mountains, a chaos of clouds playing hide and seek with their jagged peaks, or the massive cascade becoming suffused in a saffron-colored storm cloud through which the setting sun vainly tries to break. Only the mystical outlines of the rugged old pile can be traced until the sun wins in its struggle for light.

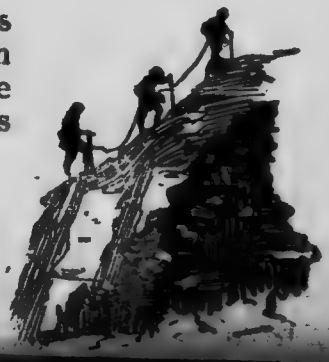
One soon discovers that there is life everywhere in and on and around the hills; Alpine flowers, singing birds, and game, little and large, from the marmot whistling at the door of his retreat among the rocks, to the mountain goat and the grizzly bear. There

is abundant life in the green-white river rushing to the ocean from the glacier that gave it birth. Even the glacier is a thing of life, for it is born of the snows of heaven, and it dies in melting away into moraines and streams. One needs only to stand on a ridge of rock overlooking Paradise Valley and the Valley of the Ten Peaks, to view the life around the sublime palisades of Mount Temple—the life of the clouds as they swirl and sweep amid these towering pinnacles, now revealing them for a rare moment and then withdrawing them from mortal vision. There is the life of majestic movement, of chaotic winds, of torn masses of black clouds whose echoing thunders bombard the cliffs with awesome music. There is life in the aftermath of the rainbow, made before one's own eyes with such diaphanous framework displayed in all its transcendent art and resting on the floor of the valley or leaning against the northern precipices.

A wondrous hour is twilight in this realm of peaks. The shadows begin to blot out the shining streak of white in the Kicking Horse River far below as the gathering darkness fills the canyon to its brim.

Slowly and laboriously the locomotive toils up the steep grade on the way to the Great Divide, only to creep down the other slope to the little station at Field nestling under the shadow of Mount Stephen. A mile sheer above the track the shattered Cathedral Peak lifts its gendarmes of rock, the rails being laid over the debris of ancient landslides, and scattered along the way are giant boulders that have rolled down the declivity. Some remain poised on the brink of the canyon; others, in their precipitous journey have leaped to the yawning depths in the valley.

The roof of the Canadian Rockies is strikingly uneven. So one discovers when gazing skyward from the valley of the Bow or the Illecillewaet; so one realizes



in ever increasing degree when the buttressing foothills of the mountain giants are left behind and an ascent is made up the steep slopes that end in cloud-piercing pinnacles. As the world of the valley recedes, and lake and glacial stream and dark green forest shrink in size, the continental watershed from Mount Assiniboine on the south to the Presidential range on the north gradually unfolds to the wondering eye.

Standing high above the realm of men, and literally among the clouds, one can understand the excelsior spirit that spurs the mountain-climber to attack after attack upon the unscaled heights. One feels the challenge to conquer the cliffs that yet confront him and stand in triumph on the very topmost pinnacle of this world of upheaved rock and snow and ice.

The trail up the Yoho Valley reveals yet another wonder-world. At one of the open spaces, the first thrilling view was had of the famous Takkakaw Falls though echoes from its tumbling waters had already been heard. The sight of this King of Canadian Niagaras, with its series of white flood leaps, is a never-to-be-forgotten one. Emerging from the caverns of the Daly ice-field, the Takkakaw makes an initial plunge of two hundred feet to try itself, as it were, and, after a moment's breath gathers its waters for the great plunge of nearly a thousand feet to another platform of rock, whence it hastens on in an ever-broadening flood over the shelving rocks to the Wapta River, on its journey to the sea.

Unforgettable, too, were the glimpses of the other gigantic cascades in this wondrous temple of nature. The Laughing Falls leap in joyous abandon from a narrow-walled gorge into a wild freedom of space that ends in a wilder cauldron e're it speeds like a racehorse to the same river that swallows up all its sister streams. Farther north the Twin Falls tumble

from their rocky clefts over a precipice five hundred feet high into a flume of rock.

Northward goes the trend of the winding trail, through cathedral aisles of stately trees, up foothills that would have qualified as mountains elsewhere and amid a riotous wealth of wild-flowers, heather and ferns. Nature does nothing by halves in her mountain gardens.

The upper path is marked by many look-out points. From one such spot was revealed the entire sweep of the Yoho Valley as a vast cleft among the hills with its green carpet of trees and roof of sky, with its wide-spread coatings of ice and its singing cascades, and with yet more distant mountain ranges walling in the scene. Surely the wide world, with all its scenic marvels, has nothing more wonderful to feast the gaze of a mortal than Canada's marvelous Yoho! Such a vast canvas it is on which the Mountain-maker has spread the scene! Such a wondrous host of colors has been used in its painting! Such a picture as only the Creator can portray!

Traveling by trail is one of the most delightful experiences Canada offers, whether on the prairies, through the forests, or over mountain passes. It means life in the open, breathing in the untainted air of the out-of-doors, and viewing nature in all her myriad attractiveness. It spells health and physical happiness and creates memories that will long after invite reminiscent thought.

No country possesses such a variety of trails as this land of Canada. The red man was the original trail-maker and many a highway, indeed many a city street, follows the curves and turns of an Indian path.

But the mountains afford the most alluring trails and none more so than the winding way to Mount Robson through the Yellowhead Pass and its wonders from Mount Robson Station on the Grand Trunk Pacific Railway. There guides and ponies are met and a single-file procession is soon proceeding on its seventeen-mile journey to Canada's greatest mountain, over 13,000 feet high, the summit of which we can see in the far and high distance resting so it seems, on a foundation of clouds.

As one follows the course of the Grand Forks River and the Valley of a Thousand Falls, there is a constant panorama to hold the eye in thrall at every turn of the winding path and on every level thereof. There is music, too, although it is a realm of silence, for the mountain world has a choir of its own in the roar or murmur of countless cascades, each sending forth its own note—some so faint and far distant as to test the most accurate hearing.

Thousands of feet above, a flood of water pours from under a floor of ice and in its first mighty leap falls sheer for hundreds of feet. Like a silver strand it decorates the great wall of rock. But it pauses on an obstructing ledge which holds it for a brief moment ere it takes another leap into the world of space, and so, cascade by cascade, it finds its rest in the river or lake. All the way down it has sung its song, a song of motion, a song of nature that seems to be instinct with life. But its rest in Lake Kinney is only temporary. Placid as is

this blue-hearted tarn, its waters are overflowing southward and eastward and once they enter the bed of the Grand Forks there is a swirl and foam and wild turmoil before they are plunged into the even wilder waters of the Fraser.

Casting one's eye downward instead of upward, there is a feast of nature everywhere to be seen. Now our ponies are creeping along a gravel path within a foot or two of a glacial torrent. While its main supply comes from the vast ice fields that glitter white upon the shoulders of Mt. Whitehorn, other contributions are being made to the stream as the water trickles over and through and under the gravel deposits beneath the ponies' feet. So there is a great hidden underground system of channels, connected, no doubt, with the snow fields a mile above us, all feeding the river as the river feeds the sea.

Over six hours of steady plugging passes when the end of the trail comes in view, though it is still three miles distant. In front lies placid Berg Lake, dotted with miniature icebergs fallen from the tumbling glacier. Mount Robson fills the vast sky canvas on the south in overpowering height and might, ten thousand feet sheer above the Pass, which we reach only after a long half-day of travel. As the valley bed begins to filter full of darkness, Robson's sublime peak receives the full illumination of the sinking sun, its vast white cliffs glittering under the light. "Unto the hills will I lift up mine eyes," and lifting them, we of the trail have our full reward.

Just stand here and see Robson Pass and you will view two especially interesting sights among the hundreds. I would have missed the one if our guide had not taken me to it. Between Berg Lake and Lake Adolphus there is one of a countless number of tiny rivulets leaping from boulder to boulder down the mountain side, and where the

tree line begins sparkles among their roots and branches. Here it is emerging into the open, a bit of stream that can be crossed at a single stride. Tree branches have roofed it in, right up to the edge of the open plain.

The little stream pauses for a moment as if to take in the new scene and decide on its future course. Its decision is a momentous one, for it makes equal divisions of its clear waters, half flowing westward to the Pacific and half eastward and ultimately to the Arctic. The course of the miniature waterway, where it actually divides itself, marks three boundary lines: that between Alberta and British Columbia, between Jasper and Robson National Parks and between the great slopes of the continental watershed. Unconscious is the tiny mountain torrent of its importance and of the ultimate fate of its waters.

Just across the valley of the Pass one stands at the very nose of the great Robson Glacier. The titanic crushing of the inconceivable force has thrown up contorted masses of ice into mounds, pillars and dangerous-looking crevasses. From a dozen openings in the green walls of ice emerge trickling streams. These combine in a larger flow into a remarkable limestone basin, making a Diana pool of exquisite beauty, with walls and arched roof forming a chamber as perfect as if fashioned by a human master hand in architecture. Over the edge of the pool and at its very centre the waters find their way in a bridal-veil falls to the world of boulders below.

The trail into Robson further reveals outstanding wonders in mountain architecture. The great base of Robson itself rises to a height of some five thousand feet out of the total altitude of thirteen thousand of the rock monster. It seems to be built on basic pillars, besides which those of Thebes are as children's playthings. Higher up

one can detect titanic pillars, long rows of Venetian windows and great, dark cavern mouths, from which subterranean waters plunge in wild precipitous leaps. At one spot on the face of the rock there is a curious scooped-out portion which is called "The Lock," because of its striking resemblance. In the farther distance one catches a glimpse, a mile away, of Emperor Falls which, when you stand at their base, are as relatively imposing as Niagara, for the heights are greater, but seen in the perspective and as part of a canvas miles in length, only a splash of white against the walls of brown and green.

So Robson and its satellites are visited; so another scenic realm is invaded, revealing anew this wonderland of hills. They are specimens only. Wherever one roams in those vast provinces there are other peaks and ranges to hold the eye in thrall. Together, they form Canada's great mountain heritage.

Packing in the Canadian Rockies

By T. W. Balderston, Banff, B.C.

AMONG all the methods of travel none are so unique as a Rocky Mountain Pack Train. Instead of engines and cars we use a number of sure-footed, hardy mountain ponies. These ponies are called "cayuses" and are used both as saddle ponies and pack ponies.

Trips are made on trails through the valleys of the mountains. These trails have been built by Government Survey men and are blazed to show

direction. The three classes of peopie taking these trips are prospectors, tourists on camping trips, and hunters after big game such as mountain sheep, mountain goat, bear and deer.

The trails lead along mountain sides where a slip would carry one many hundred feet to the valley below, then through forests where often the pony must jump over fallen timber, again across rivers, the cayuses sometimes swimming and at other times fording, then through grassy valleys which may lead to a summit from which one views the mountain streams flowing in opposite directions. The average distance traveled in a day is from fifteen to thirty miles for novices, but experienced riders will double this distance.

Experienced guides are the only persons allowed to take parties along these trails, as it is somewhat difficult to follow a trail or to pick one up again after being carried half a mile down a swift stream which the cayuse has had to swim across. A head guide, a horse wrangler and a cook generally accompany the party.

A very interesting sight is to watch the packers load the cayuses. The packers themselves wear buckskin shirts and woolly or leather chaps such as are seen quite often in the moving pictures of cowboys. The pony to be packed is tied to a post by means of a halter and rope. A pack saddle specially constructed for the purpose is then placed on his back. On each side is attached a canvas "alforjas" in which is carried the grub and the cooking utensils. Between these two pack "boxes," as they are commonly called, are placed the blankets, tepees and axes. The whole pack, weighing between one and two hundred pounds, is now covered with a tarpaulin and securely fastened in place by means of a long

rope tied into a "diamond hitch." Some people maintain that horses have very little intelligence. They have only to watch a pack pony as the packer tightens the cinches of the pack saddle after the pack is securely fastened on. The cayuse will spread his legs as far as he can and swell out with all the air he can possibly breathe in, then, after the cinches have been drawn tight under his belly, he is able to ease up the pressure somewhat by getting rid of the air inside his lungs.

After the packing is finished the party mount the saddle ponies and the train starts. For an outfit on a camping trip (which is the usual trip taken) take any form of outing clothes which one may possess, then tie a big colored handkerchief around your neck, put on a stetson slouch hat and all is ready. The women wear divided skirts as all riding in the mountains is done astride.

The guide goes ahead followed by the pack ponies and the tourist party and the horse wranglers fall in behind.

No halt is made for a mid-day meal, a lunch eaten while riding generally sufficing to take away a little of the hunger caused by riding through the bracing air of the high altitudes. About the middle of each afternoon the guide picks out a good camping spot and the pack train stops. After the cayuses are unloaded and all the ponies picketed in a convenient pasture nearby, the camp fire is built and supper is made ready. As to preparing a meal on a camp fire this is familiar to all Canadian boys and we need not go into detail. The appetite developed during an all-day ride is very similar to that developed by a bunch of boys who have just arrived in camp for their first evening meal, and as

soon as the cook has everything ready, no second call to dinner is required.

After supper the tepee is pitched on tepee poles cut for the purpose, the direction of the wind being noted so that the opening at the top of the tepee will carry the smoke away properly. The beds are made from boughs and a wood fire is started in the center of the tepee as the evening air is somewhat chilly throughout the mountains. Around the camp fire stories are told, someone with a musical instrument starts a sing-song, the events of the day's travel are talked about, and shortly after dark everybody turns in dead tired after the day's travel. The packers see that all saddles, bridles, halters, etc., are placed well off the ground, as the "porkies" (porcupines) are very fond of leather goods which they gnaw during the night.

In camp the sports indulged in are fishing for trout and mountain climbing. The hunter delights in the pursuit of big game, the king of sports in the Canadian Rockies. Two or three weeks out in the wilds, never seeing any person but those of one's own party, traveling each day in scenery more magnificent as one gets further and further away from civilization, camping in delightful spots by cool mountain streams, these are the delights which the tourist enjoys when he buys a Rocky Mountain Pack Train ticket to nowhere in particular, and these are the joys which the hunter secures when he goes to spots which abound with bears, mountain sheep and mountain goats.

Canada's National Parks

By Frank Yeigh, Toronto,
Author of "Through the Heart Canada."

CANADA has the largest chain of national parks of any country in the world. Few Canadians, probably, realize this fact and fewer still could mark them on a map. Equally few have explored their wonders though they are the heritage of all. They belong to the people in perpetuity. They are ours.

The National Parks serve a purpose in attracting travelers and tourists. Striking evidence is had in the fact that, in a normal year before the war, one hundred and fifty thousand visited our Canadian Parks, representing an expenditure estimated at fifty million dollars. Both these figures are sure to greatly and rapidly increase in the coming years. If the beauties of these great park regions were more fully realized, the numbers that would enjoy them would be multiplied ten or even a hundred-fold.

The National Parks serve a further purpose as sanctuaries of wild life. The system adopted with regard to the protection of wild life continues to show gratifying results. Wild animals and birds are increasing in all the parks and losing practically all fear of man. In the Rocky Mountains Park deer are especially numerous and so tame that they come into the townsites and may be seen in groups on the streets or nosing around back doors looking for tidbits in the shape of food. Mountain sheep and goats, which were formerly met with only in the remote districts and seldom more than five or six together, are now seen in all parts of the park, even on the motor road a mile or two from Banff itself, and frequently in flocks numberng 50, 75 or 100. In Jasper and Waterton Lakes Parks, bear, moose,

elk, beaver, grouse, ptarmigan, wild ducks and geese are also increasing noticeably. Apparently the wild life of the Rockies has found out for itself that park boundaries constitute a sanctuary. This is now especially evident in Jasper Park as great numbers of wild ducks and geese fly into the park at the opening of the hunting season, realizing that within its borders they are safe. In Waterton Lakes Park there are twice as many elk and deer seen now as at any time in the past ten years and during migration, the lakes are covered with wild fowl which remained for a week or two before completing the journey.

There will be found on the Canadian Statute Books a "Forest Reserves and Parks Act," which gives the official authority for their existence. We owe a debt of gratitude to the law-makers who had the foresight and wisdom to legislate to this end.

This Act deals with an area of nearly seventeen million acres, or nearly thirty thousand square miles, an extent of country more than equal to the province of New Brunswick in size. The mountain districts of Alberta and British Columbia supply most of this area, for they hold within their extensive boundaries some of the world's grandest scenery as well as the sources and supply of a score of great rivers that, finding their birth from the melting snows of the peaks, radiate their life-giving waters through and over the prairie sections of Alberta and Saskatchewan. It is strictly true to regard them as life-giving, for they make productive, and therefore habitable, the rich alluvial lands of the West. They carry in their wide sweep of waters untold wealth for unmeasured years.

Of our national parks, as distinct from forest reserves, their are seven: The Rocky Mountain Park, (Banff) with 1,800 square miles; the Yoho National Park, of 560 square miles; Glacier Park, 468 square miles; Jasper Park, 1,000 square miles; Elk Island Park, 16 square miles. In addition there

are, as has been said, twenty-six Dominion Forest Reserves numbering six in Manitoba, four in Saskatchewan, six in Alberta and ten in British Columiba, and constituting a region probably unparalleled for majestic mountain ranges, immense ice caps and glaciers, falls and cascades, white crested rivers running through canyon depths, forests of limitless extent, Alpine meadows carpeted with a wealth of wild flower and plant life, a wild life in bear and deer, in mountain lion, sheep and goat, in marmot and porcupine and many another four-footed denizen of the unpeopled spaces. Within these magnificent expanses is to be found a vast playground where, during the season, ideal climatic conditions exist and where nature is revealed in all her variant moods of storm and clear sky, of shower and rainbow spanning lofty peaks, of sunrise and sunset that flood the scene with a glow of glory.

The Forest Reserves and Parks Act views all the park reservations as forest reserves, under restrictions as to surface occupation and regulations and as to the protection of streams and timber. The Act in question differs from former legislation in that any portion of the area included in the forest reserves may be placed under the additional restrictions or provisions which would enable any particular area to be used as a park or pleasure resort. It further contains an advanced policy regarding utilization of timber for the use of settlers, and the reforestation or continued forestation of the land, or in the words of the then Minister of the Interior, "The economic utilization of the timber which is useful for commercial purposes and the reproduction of timber so that there will be a continuous supply." The new regulations further safeguard parks and reserves for their use, in perpetuity, of the people for purposes of recreation, with no further places of business than may be necessary. All forest reserves, in addition, may be constituted game preserves. No home-

steading will be permitted and no private ownership or alienation of surface rights will be allowed. This great sweep of country contains, moreover, natural resources of minerals and timber of a value undreamed of. Waterpower sites alone exist by the score, if not by the hundreds, and on the foothills are immense stretches of grazing lands. Every Canadian will rejoice that such a wide stretch of country is safe for all time in this our Switzerland from alienation by private ownership and will join in the hope that even greater areas will, in the near future, be brought under similar government control.

Let us visit some of these realms of scenic beauty. The Rocky Mountains Forest Reserves is the official name of the reservation in the Banff region. The setting apart of this area completed the withdrawal from settlement or exploitation of practically the entire eastern slope of the Rocky Mountains, from the United States boundary to a point two hundred miles west of Edmonton; or an area of 350 miles long and from ten to fifty miles in width—one of the largest, if not the largest, mountain park area in the world.

The reserving of such an expanse of territory is specially important, because it is in part a timbered area lying alongside of a prairie country hundreds of miles in extent which is almost devoid of trees. The forest, consisting of pine, spruce, fir and other species, clothes the mountains to a height of 6,000 or 7,000 feet. A large part of the watershed has suffered severely by fire in the past, but in most places the natural reproduction is abundant and proper protection in the future from fire will go far towards re-establishing the forest.

Banff and its Park attracts, in a normal year, visitors from nearly fifty different countries who revel in its myriad beauties of valley and peak, for it is a veritable garden of hills. It would be difficult to exhaust all its wonders, as wider none have. Only

the few have stood at the base of our great Canadian Matterhorn, Mount Assiniboine, as fewer still have stood on the summit of its towering wedge-like peak, and so standing, have been for a time on the roof of the world.

Lake Louise, the gem of mountain tarns, is within this mountain park, as are its protecting giants, and, farther afield, Temple and Hungabee, the ten peaks, Mounts Victoria and Lefroy. If Canada possessed but this one National Park, it would be passing rich.

Adjoining the Banff Park reservation on the west is the Yoho Reserve of 828 square miles, another remarkable Alpine tract, including the Yoho Valley and the towering ranges of the continental watershed. Carriage roads have been built from Field into the Valley, and picturesque trails make possible the exploration of one of the most attractive regions in the west. Falls abound, ranging from the lofty Takkakaw, the Laughing and Twin Falls, to wild little unnamed cataracts, rushing tumultuously to join the waters of the Yoho River. Alpine meadows nestle under the lee of towering rock walls and beside

the winding trails, and everywhere superb views are obtainable of the mighty rim of mountains. At one point on the upper trail the entire fifteen miles of the Yoho canyon is suddenly revealed at a glimpse with its perpendicular rock walls dropping a sheer thousand feet, and along the bed of the valley a shining streak of silver denotes the circuitous course of the Yoho River flowing toward the Kicking Horse canyon and river. To traverse the tree-lined avenue to Emerald Lake, to climb the steep ascent to Emerald Glacier and Summit Lake, to follow the meanderings of the Upper Trail to the head of the Valley and the Wapta Glacier, to camp by the Yoho and within sound of the Laughing Falls, to feast eye and mind and spirit on the surrounding panorama is to fill the hours so full of satisfaction as to ensure the sweetest of memories for all the other hours of a mortal span of life.

Journeying still further westward, the transition from the Rockies to the Selkirks brings the traveler to Glacier Park where Mount Sir Donald reigns as the Alpine monarch and where the Illecillewaet and Asulkan Glaciers represent what is left of the great ice caps of a past age. Here, again, trails have been cut in every direction. One of those recently made involves a journey of fifteen miles to the Cougar Caves and Roger's Pass. This pony route to the caverns is one of constant surprises. Vision after vision of near and distant peaks hold the eye in thrall as the ascent is made and as Mount Sir Donald seems to tower higher and higher, making pygmies of the buttressing foothills.

In one direction a fifty-mile course of the Illecillewaet Valley comes within view, tiny puffs of steam and smoke revealing trains that are curiously toy-like in perspective. No less beautiful is the Cougar Valley, guarded by Cougar Mountain, opposite which is the cave world with its weird rock caverns eaten out by water erosion during inconceivable

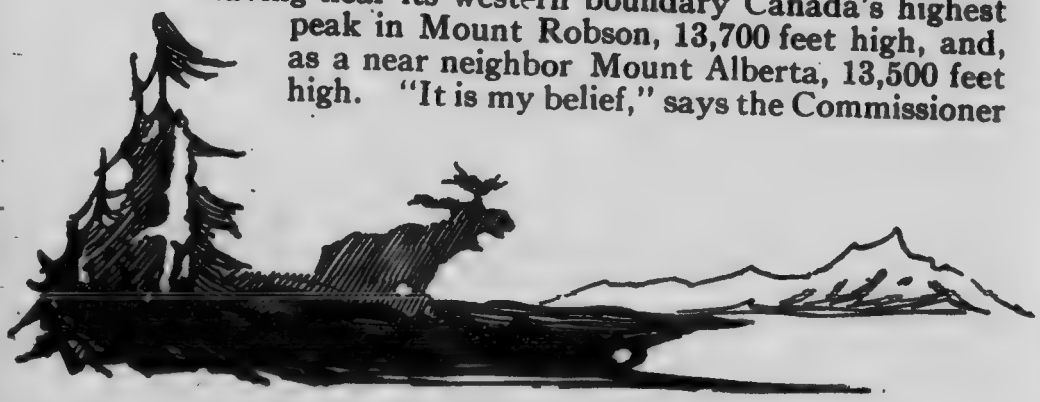
centuries. To plunge from a world of sunlight and a realm of the magnificent in nature into subterranean darkness is in itself a sensational change of scene, while the roar, now distant, now near, of the imprisoned waters, leaping in successive Niagaras to lower levels, makes awesome the journey down the steepest of ladders and over low bridges to infernos and chambers many. Strange limestone walls thrust themselves forward as if the set-pieces in a theatre, their faces bearing curious carvings in which inanimate nature imitates the world of nature in growth. Lofty ceilings, only dimly shown by the flickering lamps, leap into more substantial form with the burning of magnesium wires, the rock crystals throwing back a glittering response. Hours may be spent in following the erratic course of the hidden torrent through chambers of blackness and when emergence is finally made into the arena of the sunlit world, one welcomes and appreciates anew sun and sky and grass-carpeted earth. Then, when the trail route is followed to Bear River and over the Hermit Range, when massive Cheops is encircled and Sir Donald again sweeps into line of vision, the wonders of Glacier Park are re-impressed on the mind.

The Waterton Lakes Reserve in the Kootenay Lake country of Southern British Columbia, while one of the smallest reserves in area, including only fifty-four square miles, is yet one of the most charming sections of Canadian mountain country. Nothing more beautiful in lake and mountain scenery can be imagined and a sail over the blue water of the chain of Kootenay lakes is reminiscent of the English Lake district or the west coast of Scotland, except that the nature framing of the Canadian picture is on a more colossal scale. Busy mining towns dot the banks of the lakes and line the radiating valleys. Bench lands have been converted into fruit farms and ranches and on

every hand are evidences of prosperity amid scenes of sylvan beauty of lake and hills.

If all reports be true, and the adjectives do not call for discounts, Jasper Park Reserve, another of Canada's newest mountain playgrounds in an almost entirely unexplored territory, is a region of unrivaled alpine scenery which the Grand Trunk Pacific Railway has made accessible. Through the heart of the park runs the Athabasca River, enclosed on either side by stately peaks, whose snow-sheeted summits make a never-to-be forgotten nature canvas. The prairie stretches bordering the mighty stream constitute a picturesque valley that adds a note of variety to the wonderful landscape.

The towering hills of Jasper Park rise above the watershed of a continent wherein are the headquarters of five great rivers: the Saskatchewan, the Athabasca, the Thompson, the Columbia and the Fraser; two flowing eastward and irrigating the great plains; three chiselling their course westward until, overcoming nature's greatest obstacles, they lose their life in the Pacific. Around one on every hand are the giant ice caps that feed the quinette of streams and their innumerable glacial tributaries; above one rise the titanic rock masses of mountains, while near at hand, blue-watered tarns and white-sprayed cascades, alplands alive with flowers and valleys that call to their recesses, make Jasper Park a wonderland of wild beauty, having near its western boundary Canada's highest peak in Mount Robson, 13,700 feet high, and, as a near neighbor Mount Alberta, 13,500 feet high. "It is my belief," says the Commissioner



of Dominion Parks of Canada, "that Jasper Park will eventually outstrip all others in the Dominion in importance and when the natural resources are looked into and developed it will become a source of perpetual revenue to the country."

This vast and unsubdued alpine world of the north, hitherto remote as it has been, has yet an atmosphere of history and legend created by red man and half-breed, by *voyageur* and *courier du bois* by fur-trader and factor, and more recently by the lonely prospector and explorer. Within its spacious boundaries has been epitomized the evolution of the great loneland of prairie and mountain such as marks other regions of Alberta and British Columbia.

On the banks of the Athabasca once stood the ruins of Jasper House and Henry House, old trading posts of the Hudson's Bay and North-west Trading Companies in the days when a relentless mercantile war existed between the two. Little did old Jasper Hawes, the Hudson' Bay trader of 1800, dream that he should be immortalized a century after by having the region in which he had his headquarters named after him, or that a transcontinental railway would lay its tracks of steel where only tracks of mountain ponies or wild game had been seen. And as little did William Henry, Northwest Fur Company man of a hundred years ago, when he chose his charming site for trading station at the headquarters of the Athabasca, forecast that his own company was doomed to disappear or that the trail of his log cabin would be a route for the prospector and the railway engineer as the advance guard of a stream of travel soon to flow through the Pass of the Yellowhead.

Hard by the deserted cabins are the farms of a few plucky pioneers who, undeterred by the isolation and loneliness, have successfully engaged in agriculture where crop failures are unknown, thanks

to the mild climate made by the chinook winds. But, as all these parks are reserved from settlement, these squatters have, with one exception, been compensated and have taken up land outside the park.

Patches of nature-green timber mark the valley, but they are only remnants of the once great forest that existed. With the future protection and natural reproduction of the pine and spruce, reforestation may in a measure repair the damage of the fierce fires of former days.

Nature has further provided Jasper Park with extensive hot springs on Fiddle Creek, the waters carrying a distinctly sulphurous odor and taste, and reaching a temperature of 127 degrees. To reach the springs at present involves a hard day's travel over muskeg and windfalls, but the beauty of the scenery along the valleys of the creek under overhanging cliffs amend for the difficulties of reaching it.

Another governmental reservation, unique in area and purpose, is Buffalo Park, located near the Grand Trunk Pacific divisional point of Wainwright, 120 miles east of Edmonton. This stretch of typical rolling prairie country is the home of Canada's great buffalo herd of several thousand, comprising practically all left in a part of the continent where they once roamed in herds of thousands. 110,000 acres have been enclosed by a fourteen-strand wire fence, no less than seventy-three miles in length, sufficiently high to safely hold the big animals. This fine, new, prairie park is dotted by many lakes that give it a park-like appearance. As in former days, so now it is an ideal grazing ground for buffalo in a wild state, and where the conditions are favorable to their speedy natural increase. The action of the Dominion Government in securing the famous Pablo herd of Montana, and thus saving the animal

from extinction, was a highly commendable one, with the result that Canada now possesses the last great herd of these lordly beasts. The interesting fact has been noted that the birds near the Buffalo Park, when disturbed, will fly over the wire fence and settle in the park for protection.

A comparatively little reservation is the Elk Island Park of 16 square miles located at Lamont, in the Beaver Hills, some forty miles east of Edmonton. It was originally acquired by the Alberta Provincial Government as a forest and game preserve. Here a small number of Buffalo are kept as a nucleus of another herd, with a considerable number of elk and deer.

This completes our tour on paper of Canada's National Parks and Forests Reserves. The list includes only the Dominion ones. It should be borne in mind that several of the provinces have equally fine park areas, such as Algonquin in Ontario or the Laurentides in Quebec. They constitute a national asset beyond estimate—a value that will be more and more realized as the years pass as their beauties are enjoyed and their untrodden spaces further explored.

CHAPTER XIII

A LITTLE AGRICULTURAL SCIENCE

Development of the Dairy Cow

By Prof. H. H. Dean,
Ontario Agricultural College, Guelph.

ABOUT 2000 years before the beginning of the Christian Era, there flourished in Egypt a form of worship of which the "Hathorpow" was the centre. A modern writer says of this Deity: "The shrine in which this particular cow goddess was placed, was a cave about ten feet long and eight feet high, cut into the solid rock and lined throughout with slabs of sandstones. The figure is of natural size, the color is a reddish brown, with spots which look not unlike four-leaved clovers. The head, neck, and horns of the cow were originally covered with a very thin coating of gold leaf. The goddess is represented as suckling a boy and protecting a man who stands underneath her neck. Both of these figures are no doubt intended to represent the king, the idea intended to be conveyed being that Hathor was the divine mother of the king, who had nourished and was still protecting him. By means of these

symbols the Egyptians were taught the relation of cows to man. Thus early, mankind learned to respect and worship the dairy cow." In these modern times the cow has been called, "the foster-mother of the human race," because were it not for cows' milk, thousands of children would starve in a short time.

Of all domesticated animals, the cow has responded best to man's efforts in the way of improvement in the milk-flow. Mammals, or animals which suckle their young, under natural conditions give enough milk to start their offspring well in life, then the milk-flow ceases—or as we say of cows, they "dry up." By persistent efforts on the part of man, cows, which under a system of nature would not give over 1000 lbs. of milk in a year, have been developed until now they give from 700 to 1000 lbs. of milk in one week; and from 20,000 to 30,000 lbs. of milk in a year. How this has been accomplished is a very interesting story, which extends over a long period of time and has been wrought out by many men in many different parts of the world.

The giving of milk in large quantities, being an acquired chacteristic which has been developed by man's skill in breeding, feeding and selection, is early lost. Cows tend to revert to the original type, unless they be properly bred, well fed and the best animals selected to remain in the herd. Men have found by means of weighing and testing milk and keeping records, that certain families among each of the dairy breeds, are more noted for milk and milk-fat production than are others. Animals from these families are mated and the off-spring are usually, though not always, good milkers. By feeding these the proper kind of feed, giving them the best housing and care possible and mating these again with animals from a

good milking family, the milking qualities of dairy cows are gradually being improved.

One reason for slow improvement among dairy cattle, is lack of proper milk records of individual cows. Records enable the owner to know the good and poor cows in the herd. In order to obtain this information, it is necessary to weigh the milk from each cow at stated intervals where it is not practicable to weigh each milking, although weighing daily is to be preferred. A suitable milk-scale, a properly ruled milk sheet, a pencil convenient for recording weights, a sample bottle properly labelled for each cow and, most important of all, a will to do, are the requirements for keeping a milk-record of each animal in the herd. A good milk-scale, weighing up to 60 lbs., and having two hands with a circular dial, is the most convenient form. This will cost about five dollars. Sheets for recording weights of milk can be obtained free from the Live Stock or Dairy Branch of the Provincial or Dominion Departments of Agriculture.

The samples will be tested for fat free by the Dominion Dairy Commissioner, particulars of which can be obtained by applying to him at Ottawa.

Pure-bred dairy cows are tested free under "Record of Performance" Rules, particulars of which can be secured from the Live Stock Commissioner, Ottawa. The Canadian Holstein-Friesian Association have a system of testing cows of their breed known as "Record of Merit." Particulars of this may be obtained from the Secretary at St. George, Ontario.

From the foregoing we learn that there is ample provision made for testing the dairy cows of Canada. No dairyman should neglect this point, as it lies at the foundation of proper selection, mating, and improvement of our dairy cattle.

Efficiency Tests

A boy interested in cows should be able to make arrangements to weigh the milk from each cow milking, and at the end of the lactation period (length of time milking) be able to say how many pounds of milk were given by "Bess," "Blackie," "Bob-tail," and every other cow in the herd. If "dad" be a progressive dairyman, I feel sure that he will be willing to reward his boy in some way for the progressive spirit shown in keeping a milk-record. With a milk-scale hung in a convenient place in the milk-room or stable, a three-days-a-month, or a daily-monthly sheet and pencil conveniently located, the actual time of weighing and recording the weight of milk from each cow need not be over one minute per day. The total of the daily weights for each cow should be transferred monthly to a permanent record book. This is furnished free by the Dairy Commissioner at Ottawa.

A second efficiency test may be applied by the boy who goes further than weighing the milk and who, in addition, takes samples and tests these for milk-fat with the Babcock test. A suitable tester for a farm can be purchased for about five dollars. With a few lessons any smart boy can easily test milk for fat and by this means know which cows give rich and which poor or low-testing milk. The pounds of milk multiplied by "the test" or percentage of fat, and divided by 100, gives the pounds of fat in any weight of milk. By adding one-sixth to the fat, we are able to calculate the pounds of butter in the milk. For example, if a cow produced 300 lbs. of milk in one week, testing four per cent. fat, her milk will contain $300 \times 4 \div 100 = 12$ lbs. fat, 1/6 of $12 = 2$. $12 + 2 = 14$ lbs. butter for the week, which is considered to be a very good cow for an average dairy farm. The monthly totals for milk-fat should be recorded for each cow in a permanent

record book for future reference and as a guide in breeding future dairy stock.

A third efficiency test might be for the boy who is able to get one or more pure-bred cows in the home herd, entered in either or both of the Official Records is of "Performance of Merit"—the latter, of course, possible only in the case of registered Holstein cattle. The boy who has enterprise and pluck enough to enter a competition of this kind with older and experienced breeders and feeders, deserves considerable credit yet, I doubt not, we have a number of such boys on the farms of Canada.

It would be necessary to have proper supervision of these tests. In the case of "Official Tests," a strict supervision is given by Government Inspectors, but in the case of private records or tests they would need to be inspected by a properly qualified person.

The Story of No. 104

Dr. C. A. Zavitz,
Professor of Field Husbandry,
Ontario Agricultural College, Guelph.

JUST previous to the war Canada produced per unit of population more food materials obtainable from farm crops than any of the other leading agricultural countries of the world. In this respect she was followed in order by the Argentine Republic, the United States, Australia, Germany, Austria-Hungary, France and Russia.

Wheat is used more extensively as human food than any other cereal. It is particularly rich in

nutritive materials and with the exception of rye, no other grain contains a gluten which is capable of expanding and forming light, porous bread. Wheat differs in composition from all other cereals in that its gluten is composed of two proteids, gliadin and glutenin. This gives flour its bread-making value. Bread can be made from wheat flour alone or in combination with flour from other grains. Wheat is easily grown, rapidly transported and conveniently stored when necessary.

It is claimed that wheat was used as food by the Chinese two thousand seven hundred years before the Christian era, by the Egyptians at even an earlier date and that it was cultivated by the Swiss Lake dwellers and other pre-historic races. There appears to be no authentic record of wheat growing wild and naturally re-seeding itself without the help of man.

It will, therefore, be seen that wheat is one of the most important crops of the world and man has exerted a very marked influence on its development and its improvement. There are now hundreds of varieties of both winter and spring wheats and these constitute innumerable types. The varieties vary in many respects and these variations have permitted the numerous kinds of wheat to adapt themselves to different climates, soils and uses. Some of the varieties have been originated through selections and others through hybridization. To originate a new and a valuable variety of wheat not only demands skill of operation but it is of immense economic value. It also required knowledge, not only of the needs of agriculture, but of some of the principles of heredity. There is scope for close application and the best thought of people of high education and of lofty ideals.

It might be interesting in this connection to give the history of the O.A.C. No. 104 variety of winter wheat which has been originated at the Ontario

Agricultural College and which was distributed to farmers for co-operative experiments for the first time in the autumn of 1916.

In the summer of 1881 Robert Dawson, a farmer living near Paris, Ontario, had a promising field of the White Clawson variety of winter wheat. A very heavy storm caused the grain on this field to become badly lodged. Mr. Dawson, while walking over the field of grain which had been flattened and partly beaten into the ground, found one plant, the stems of which were mostly standing. He thought that possibly as this plant was more erect than others it might be due to an unusually stiff straw. As the grain was ripened at the time he carefully saved the heads from this single plant. These were shelled by hand and the grains were sown in a little piece of ground near the house in the following autumn. As the growth was promising Mr. Dawson was soon enabled to increase the crop sufficiently to not only supply his own requirements but also to sell seed to his neighbors. A bag of the new wheat under the name of Dawson's Golden Chaff, was entered at the Autumn Seed Fair at Guelph and received first prize. It was tested in the experimental plots at the Ontario Agricultural College and proved to be one of the stiffest strawed and most productive varieties under test. It was later distributed to farmers over Ontario through the medium of the Ontario Agricultural and Experimental Union. It was increased in various localities and has for a number of years past been the most popular and the most extensively grown winter wheat in Ontario. It has a stiff straw, a red beardless head and a white grain. Although the Dawson's Golden Chaff is a heavy yielder the grain is comparatively soft and is more suitable for the manufacture of pastry and of breakfast foods than of flour for manufacturing into bread.

Another important variety of winter wheat known as the Bulgarian has been under test at the College for many years. It is also a white wheat but with a medium strength of straw and a medium yield of grain per acre. This variety, however, has made a high record for bread production as tested in the Bakery department at the College. It was thought that if the Dawson's Golden Chaff and the Bulgarian varieties could be cross-fertilized and a new variety originated, eliminating the undesirable and retaining the most desirable characteristics of the two parents, a very valuable acquisition might be made to agriculture.

A complete flower consists of two essential parts, the stamen and the pistil and two floral envelopes, the corolla and the calyx. The two former contain the organs of reproduction and the two latter give the brilliancy and the beauty to the flower. Either the corolla or calyx or both may be absent in which case the flower is said to be incomplete. It is usual for the stamens and the pistil to be in the same flower. Sometimes they occupy separate flowers on the same plants and occasionally the stamens are produced on one plant and the pistils on another. In the case of wheat both the stamens and the pistil are found in the same flower. In each flower there are three stamens and one pistil. The stamens contain the pollen grains which are small, uniform and yellow in color and the pistil the egg cells. For reproduction to take place it is essential that each egg cell be fertilized from a pollen grain.

Some of the farm crops such as wheat, barley, oats, peas, and beans are naturally self-fertilized owing to the fact that fertilization takes place before the flowers are opened and exposed. In

other instances, however, such as corn and rye, natural cross-fertilization takes place. This is clearly demonstrated in the case of corn. Every silk emanating from an ear must receive a vital pollen grain before a kernel of corn can be produced. As the pollen grains are produced on the upper part of the plant and the ears of corn some distance below, the pollen is usually conveyed to the corn silks through the agency of the wind. This accounts for the frequent mixing of varieties when grown in near proximity to each other.

From what has been said it is evident that in order to secure hybrid grains of wheat it is necessary to artificially cross-fertilize the flowers. The O. A. C. No. 104 variety of winter wheat originated from a single cross between flowers of a choice plant of each of the Dawson's Golden Chaff and the Bulgarian varieties. Soon after a head of Bulgarian wheat appeared above the sheath a flower was carefully opened and the three immature stamens were removed. These were replaced by ripened anthers and pollen grains taken from a choice head of the Dawson's Golden Chaff. In due time fertilization took place and a hybrid grain was produced. This grain, in the course of a few years, produced a great variety of plants possessing different combinations of the characteristics of the two parents. These were carefully studied and the one numbering 104 on the list was found to possess in itself a combination of a number of the most desirable features of the two parent varieties.

In experiments at the Ontario Agricultural College in the past six years the O. A. C. No. 104 variety of winter wheat has produced an annual average yield of grain per acre of 45.0 bushels while the Dawson's Golden Chaff for the same period has produced 40.0 and the Bulgarian 37.5 bushels. It will, therefore, be seen that the O. A. C.

No. 104 has surpassed each of its parents in productiveness. It has given a grain which is almost equal to the Bulgarian for bread production.

The O. A. C. No. 104 variety is a vigorous grower with a comparatively stiff straw. The grain is white and the variety resembles the Dawson's Golden Chaff in being beardless, and the Bulgarian in having a white chaff. It is to be hoped that this offspring may prove of even greater service than either of its parents.

In conclusion it might be stated that the principles of heredity are similar both in plant and animal life and are worthy of careful study.

CHAPTER XIV

GAS ENGINES AND WIRELESS TELEGRAPHY

The Gasoline Engine

By Albert Young, B.A., B.Sc.
Instructor in Motor Mechanics, Toronto Technical School.
Illustrations by the Author.

THE gasoline engine has become a wonderful servant of men. The steam engine with its cumbersome boiler has done well enough in the mills and factories turning the wheels of industry, but the gasoline engine has brought a mechanical power into the very homes of an ever increasing number of people. In war we find it in the aeroplanes, the submarine hunters, the armored cars, the big tanks and the thousands of ambulances and tens of thousands of trucks behind the lines. In peace it carries many a city-tired family, or hard-working farmer over hills and valleys to a bigger and better acquaintance with health and life.

Surely a knowledge of the construction and method of operation of the gasoline engine is a part of the education of every TUXIS BOY. In the few words,

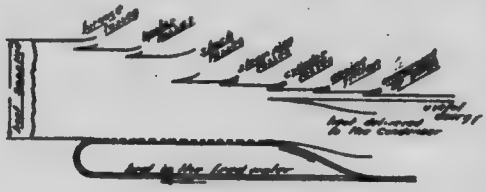
which follow, we do not pretend to give any thorough knowledge of the gasoline engine, that can be obtained only by long practical experience in actual contact with the many types of engines, but we do hope to introduce the topic and awaken a well-deserved interest in the subject.

Engines that change heat into mechanical energy are of two classes, viz., those in which the burning of the fuel is accomplished in some receptacle outside the engine and those in which the fuel is made to burn in the engine itself.

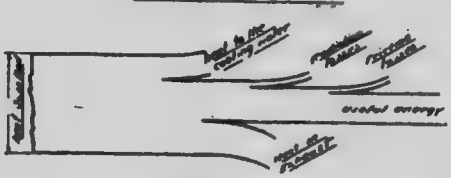
The steam power plant is an example of the first class. In such power plants the fuel is burned upon a grate beneath a boiler and the heat generated is partly absorbed by the water. When the temperature corresponding to the required pressure is reached the water begins to boil and steam is formed. This steam carries the heat from the fuel through the various pipes to the engine cylinder where it is allowed to expand and move the piston in the cylinder. During this expansion process, the steam becomes cooler with lower pressure. Part of the heat given up goes directly to the cylinder wall, part is converted into useful work and part is sent out with the exhaust steam. The losses in such an engine are very large and even in the best-designed power plants 15% is the greatest over-all efficiency obtained. In other words, out of 100 heat units shovelled into the furnace the equivalent of only 15 heat units are to be obtained at the flywheel of the engine.

The second class of engine is made up of those engines in which a mixture of fuel and air is burned in the engine cylinder itself. The gasoline engine is an example of this class. In such an engine the gasoline is mixed with a proper proportion of air, drawn into the cylinder, ignited and burned. Part of the heat liberated is made to do useful work in driving the piston forward, part is radiated to the cooling water and part is exhausted. By burning

the fuel in the cylinder, the boiler and steam pipes, with the losses which go with them, are prevented. It will be expected therefore that such an engine will show a much higher efficiency than the steam power plant and such is actually the case. Gasoline engines give an efficiency from 15-30%. The two illustrations given in Figures 1 and 2 show how each power plant uses the heat supplied and how much is obtained in useful work.



—Fig 1—
Where the Heat goes
in a Steam Power Plant.



—Fig 2—
Where the Heat goes
in a Gasoline Power Plant.

Now there are two common kinds of gasoline engines; those which operate on what is called "Two-Stroke" cycle and those which operate on the "Four-Stroke" cycle. A cycle may be regarded as that circle of events which happens to each charge of fuel that is taken into the cylinder. It includes the drawing in of the fuel, compressing the fuel, igniting and burning the fuel and discharging or exhausting the dead products of combustion. Each of these events in the engine under consideration require, roughly speaking one stroke of the piston and hence the name "Four-Stroke" cycle. In Fig. 3, at (A) the piston is at the top of the cylinder and is moving downwards. Air and gasoline are drawn in through the inlet valve, and as the piston continues to move down, more and more fuel will be drawn in until the whole space within the cylinder is filled with explosive mixture. When the piston reaches the end of its down stroke, the inlet valve closes, and as the piston moves upward the gasoline and air are compressed, the pressure rising to 60 lbs., or possibly 90

lbs., per square inch. When the piston reaches the top of stroke B, or slightly before, the fuel is ignited by an electric spark. A somewhat violent combustion takes place, the temperature rises to possibly 3000° F, and the pressure to 300 lbs. per square inch. The expansive forces of the gases under such conditions drive the piston rapidly downward as at C, and considerable energy is imparted to the flywheel of the engine. When the piston reaches the end of this firing stroke the exhaust valve opens and as the piston returns on its fourth stroke the dead gases are expelled from the cylinder. These four strokes, viz., suction, compression, firing and exhaust constitute the four-stroke cycle of the most common type of internal combustion engine.

It will be observed that these four strokes require two complete turns of the crank-shaft and that for these two turns only one impulse or working stroke is obtained. During these two turns of the crank-shaft the inlet valve opens and closes once and the exhaust valve opens and closes once. It

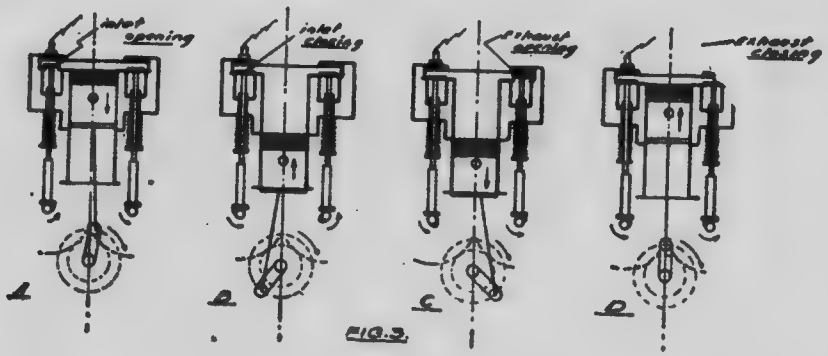


FIG. 2.

is evident, therefore, that the mechanism which is used to operate these valves, namely the camshaft, turns at just one-half the speed of the crankshaft; while the crankshaft makes two complete turns, the camshaft needs to make only one.

Now when we apply the "Four-Stroke Cycle" to the actual engine the so-called strokes may be more or less modified. In practice the inlet valve seldom opens when the piston is on its upper centre, but usually a short distance down. Also the inlet valve remains open until the piston has returned part way up on its compression stroke. The exhaust valve opens very much before the end of the firing stroke and may remain open a short time after the end of the exhaust stroke. The average length of these strokes as used in automobile engines are shown in Figure 3.

For purposes of valve timing the two turns which the crankshaft makes for each complete cycle are divided into 720°. The suction stroke which begins 8° late continues for 210° or 38° past the lower dead centre. The compression stroke will be very much shorter on this account, being only 142°. The firing or working stroke will be from the upper dead centre until the exhaust valve opens and is shown as 134°. The exhaust stroke which finishes the cycle will be 226°. The suction stroke is continued to secure as large a charge of fuel as possible and the exhaust stroke is continued to clean the cylinders of dead burned gases as thoroughly as possible. The efficiency of the engine depends very largely upon these two parts of the cycle. Where an engine has only one cylinder, like the small portable engines used for farm purposes, all the energy which the engine gets from the gasoline during one cycle of operation is given to the piston during the 134° of crank travel. This energy is transmitted through the connecting rod to the crankshaft and flywheel where it is stored up. The flywheel then gives this energy out to the engine again to turn it through the remaining 586° of the cycle.

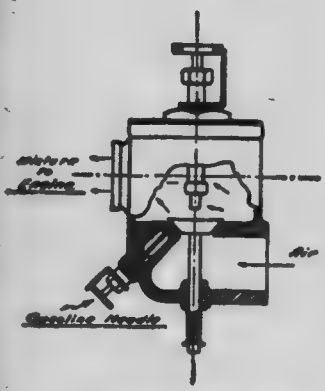
With two-cylinder engines there would be two firing strokes during 720° of crank travel and with

a four-cylinder engine four firing strokes in the same time. It is to be carefully noted, however, that even in a four-cylinder engine the power strokes do not overlap one another, but are separated by 46°. If the energy stored up in the flywheel and moving parts is not sufficient to overcome the friction, to draw in the fuel, compress it, operate the valves and carry the outside load at the same time, then the engine stops or "stalls." In six, eight or twelve-cylinder engines, which of course give six, eight and twelve power strokes per cycle, the power strokes can be made to lap one another so that there is a continuous flow of energy from the gasoline to the moving parts. In these engines the liability to stall is much less and the engine can be made to revolve much more slowly and smoothly.

We shall now leave the consideration of the four-stroke cycle, but the reader is recommended to turn any engine over slowly and mark the relative lengths of each stroke and compare the results with those given above. We must now go on to consider how the engine is supplied with fuel and how this fuel is ignited, burned and exhausted, how the moving parts are oiled and cooled, or in general to consider all those parts which are grouped around the outside of the engine in a great variety of ways, but all of which are absolutely indispensible to the continuous performance of the engine itself. In fact we may look upon the gasoline engine as having five servants whose duty it is to wait upon their master and keep him supplied with those things necessary for automatic running. These five servants are: The fuel system, the ignition system, the oiling system, the cooling system, the exhaust assembly.

The Fuel System

By the fuel system we mean all those parts necessary for storing the fuel, carrying it to the engine and mixing it with the proper proportion of air for burning. These parts usually consist of a fuel tank with a shut-off stop cock, a pipe line, a carburetor or some device for mixing the air and gasoline and, finally, in multiple-cylinder engines, a manifold to convey the mixed fuel vapor to the various cylinders.



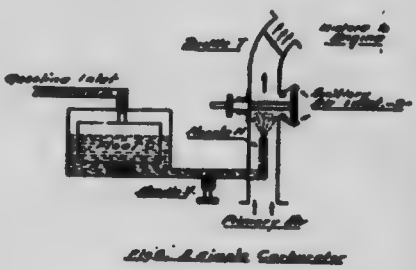
Mixing Valve Fig. 5

In small stationary engines the device for mixing the air and gasoline is usually a simple mixing valve, (Fig. 5) but, in automobile engines where the engine speed is required to vary a great deal the device for proportioning the air and gasoline is much more elaborate. These devices are called carburetors and there are many different types. The essential parts of a carburetor are shown in Fig. 6. The gasoline from the supply tank flows into the float chamber C and lifts the float when it reaches the required height. This float keeps the gasoline at the proper level in the nozzle N. The needle valve V regulates the rate of flow of gasoline to the engine. By opening this valve a richer mixture is obtained. By closing it a lean mixture is obtained. The opening in the nozzle is very small and as the gasoline issues from this opening it is divided into minute particles which soon change from liquid to vapor. Air is drawn in through A and as it passes the nozzle it is mixed with the gasoline vapor. This mixture may at the higher speed of the engine be further diluted by air entering above the nozzle at S.

The action of the carburetor is as follows: When the piston goes down on its suction stroke a partial vacuum is created above the nozzle N. This is

caused by the restricted area of the air inlet. This partial vacuum causes the gasoline to spray out as described above and the air rushing past the nozzle carries the gasoline up through the throttle valve into the inlet manifold and thence into the cylinders of the engine. Now, with increase in speed, the vacuum pressure above N increases and the rate of gasoline flow also is increased, but not in proportion. More gasoline than what is required will be mixed with the air under such conditions or, in other words, the increase in the speed of the engine would be accompanied by an increased richness in the fuel mixture. To overcome this tendency to "flood" the engine at higher speeds the extra air valve is added. This valve is usually held shut for low-speeds by a spring, the tension on which can be regulated for best results.

Other carburetors may have two nozzles, one for low speeds, one for high, or they may have both nozzles working together, but one with variable levels for the gasoline. There are many kinds of carburetors, but all of them aim at giving more or less constant mixture for the varying speeds of the engine.



Ignition System

Next in importance to getting a properly proportioned fuel into the cylinder is the method of igniting it. In all cases the fuel is ignited by an electric spark, but this spark is made to occur in two ways. These two ways are the low-tension or make-and-break system, and the high-tension or jump-spark system. In the scope of this article we can but touch upon the principles underlying each system and trust the reader to investigate the details of each system for himself.

THE LOW-TENSION SYSTEM

This system is commonly used on small stationary single-cylinder engines of low speed. The source of electric current may be a dry-cell battery or a low-tension magneto. The current, from whichever source, when switched on, passes through the coil C (Fig. 7) and thence to the points inside the cylinder and returns to the battery through the engine frame. When the proper time for the spark to occur in the cylinder comes the points PP (Fig. 7) are separated quickly by the special mechanism outside the cylinders. This breaking of the electric circuit at PP causes a spark at these points and this spark is hot enough to ignite the mixture of gasoline and air which has been previously compressed. This system while very simple is not very reliable. The moving points inside the cylinders are rapidly corroded by the high temperatures and are hard to keep in adjustment. The mechanism is noisy at high speed and for multiple-cylinder engines this system is no longer used, but a high-tension or jump-spark system is employed.

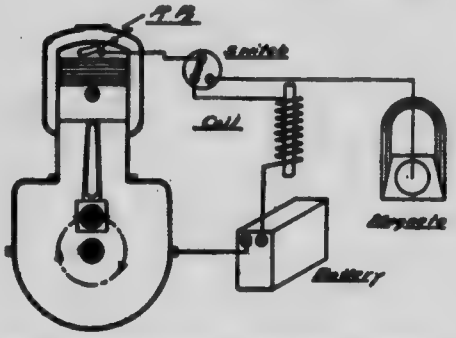


Fig. 7 - Make and Break or Low Tension Ignition -

THE HIGH-TENSION SYSTEM

In this system there is placed in the cylinder what is called a spark plug (Fig. 8) which has a central terminal insulated from the cylinder by mica or porcelain. When the proper time comes the voltage across the spark gap is made sufficiently high, by means of an induction coil, to jump the gap. The heat developed by this spark is enough to ignite the gases. The parts employed in the various high-tension systems vary somewhat in form and position, but the essential parts in all of them are as follows:

1. There must be a source of electric energy which is usually low voltage, 6-10 volts. This may be obtained from dry cells, a six-volt storage battery, or a low-tension magneto.

2. This low-voltage current is allowed to pass through an induction coil which changes the voltage from 6-10 volts to possibly 800-1500 volts. The spark plug is made part of this high-voltage circuit with the result that the current jumps the gap as before mentioned.

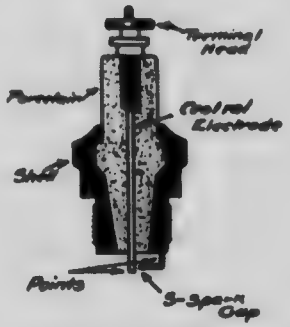


Fig. 8
A Spark Plug (Section)

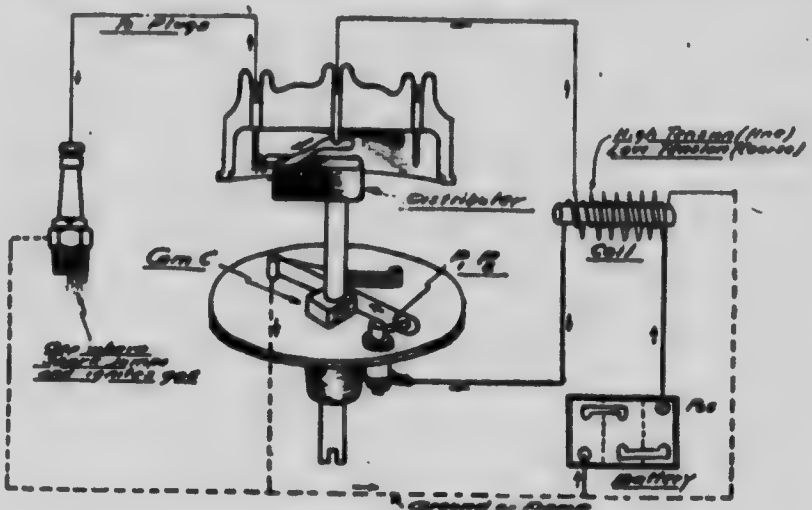
3. In order to "time" the spark a timer or breaker is inserted in the low-voltage circuit. The instant the breaker points P P open the spark jumps the gap S.

4. When there are more than one spark plug, that is, more than one cylinder, a distributing switch has to be employed to convey the high voltage current to the correct cylinder.

In Fig. 9, the battery represents the source of low-voltage current. One side of this battery, usually the negative, is grounded to the frame of the engine. The current flows from P, through the inner coarse winding up the induction coil to the two points in the breaker. The first point P, is insulated from the engine, but P2 is grounded. The current, therefore, has now a complete circuit, the only break in it being at the points P1, P2. As the cam C rotates these points come together and separate. Now surrounding the coarse winding in the coil is another winding consisting of a great number of turns of very fine wire. One end of this winding is grounded as shown, the other end goes to the spark plug.

When the two points P1, P2 come together a current flows in the primary winding of the coil. This magnetizes the iron core so that there is a

strong magnetic field permeating the fine-wire secondary winding. When the points are separated by cam C, the current in the primary is suddenly broken, the magnetic field is destroyed and a current of very



-Fig 2-
Battery and Coil Ignition

high voltage is induced in the secondary winding. This secondary current can complete its circuit only by jumping the gap at the spark plug and if the system is properly operated that is what happens.

In four, six or eight-cylinder engines the cam C will have four, six or eight projections or noses and the points P1, P2 will be opened by each one. The secondary wire, instead of going directly to the spark plug, will go to a distributing switch having the same number of points as there are cylinders.

The system as described above is the one employed on most automobile engines other than the Ford. In the Ford ignitor system the low-voltage current is produced by the magneto which is incorporated with the flywheel. This low-voltage current goes to the vibrating coils in the coil box where its voltage is increased to the required pressure and then con-

ducted to the spark plugs. Each spark plug has its own coil, so that a distributing switch is not required. The timing is accomplished by the commutator which completes the low-tension circuit between the magneto and each coil at the proper time. Although this system looks considerably different from that illustrated, the principles are very similar. Where, in the usual breaker, the points P1, P2 are opened mechanically by the cam C, in the Ford coils the primary circuit is opened or interrupted electrically by the "trembler." In the first system each spark is just a single flash, but in the Ford system each vibration of the trembler makes a spark so that there is a shower of sparks each time the primary circuit is completed. To sum up—a high-tension ignition system as employed on automobile engines is made up of four main parts: 1. A source of current, low voltage. 2. An interrupter, breaker or timer. 3. An induction coil to step up the voltage. 4. A distributing switch to convey the high-voltage current to the various spark plugs.

Cooling

When we come to the cooling system we have something very much simpler to think about. That the engine must be cooled is very evident. The temperature obtained within the explosion chamber in the gases themselves may be as high as 3000° F, at which temperature the cylinder would become red hot, the bearings would melt and the engine stop. The best oils for lubricating the interior of the cylinders begin to burn at a temperature about 500° F. so that this is the maximum temperature allowable on the parts which get hottest. The cylinder walls are kept down to a temperature around 200° F. although the piston head may be as hot as 400° F.

The methods employed to accomplish this cooling are two. The first method consists in blowing air

over the outside of the engine, the walls of which are made with fins to increase the radiating surface. The second method is to surround the cylinder walls with a water jacket in which water is kept circulating. The water is then cooled by blowing air through it while it circulates in small tubes in a radiator. In small stationary engines the water may not circulate at all and is allowed to boil but in automobile engines it seldom goes above 185° F.

In general, the hottest engine consistent with mechanical efficiency gives the most power for the least fuel, but it is thought wise from the standpoint of oiling to keep the engine fairly cool.

Oiling

In small stationary engines of the horizontal type oil is usually supplied to the piston by allowing it to drop out from a sight-feed oil cup. In this method the oil drops upon the side of the piston and finds its way over the whole interior of the cylinder. The crank and main bearings are also oiled from cups and the oil feeds to them a drop at a time.

In automobile engines the oiling is much more difficult. This is due to the high speed of the engine and the greater number of cylinders. There are several systems employed, but the main ones are four: 1. Full Splash system. 2. Splash with a circulating pump. 3. Partial force feed. 4. Full force feed. In the first the oil is contained in troughs below the crankshaft and the cranks as they revolve dip down in the oil, splashing it in every direction. Some of the oil splashes on the bearings some on the cylinder walls, on the piston, crankshaft and other parts. This is a simple method and used in all of the early cars.

In the second method the oil is contained in the lower part of the crank case and is pumped up into the trough below the cranks by a pump. The engine

is then oiled by splash. This system is better than the first in that the oil level in the troughs is more constant and oiling at high speeds is more efficient.

In the third method the oil, instead of being pumped into the troughs, is pumped to the main bearings and crank bearings. As the cranks revolve the excess of oil is thrown off and oils the exterior of the engine. It also collects in the troughs below the cranks, is again splashed around the overflow from these troughs and returns to the main oil container or sump.

In the fourth system the oil is conveyed from the pump by ducts to every part of the engine requiring oil. The overflow is returned to the pump through a filter and again pumped out. There will be a slight splash as well, b by this system oiling is made absolutely certain.

Whatever system is employed the quality of the oil is of the utmost importance. Oil must be free from acid, capable of withstanding heat up to 450° F. and have enough body at these high temperatures to lubricate the rapidly moving parts. The best oil is none too good, and oil is always cheaper than engine parts and mechanics' time. It is the poorest of economy to use cheap oil, since cheap oil usually means rapid wear, loss of compression, high gasoline consumption and quick depreciation generally.

Exhaust Assembly

The exhaust assembly includes the exhaust manifold, exhaust pipe, possibly a cut-out valve and the muffler; when the engine has finished its firing strokes and the exhaust valve opens the gases are usually still burning. Without the exhaust manifold the gases would come out as flames, have considerable heat, high pressure and much noise. To overcome this, the exhaust gases are conveyed to the muffler where both the temperature and pressure are lowered before the gases are allowed the escape. Exhaust

mufflers should be kept clean, since clogging will cause loss of power and over-heating.

Troubles

The finding of the cause of trouble in a gasoline engine requires thought and reasoning. If one understands the principles of operation and the details of construction the process of locating trouble is not hard. Decide first if the trouble is in the ignition or in the carburetor, or the oiling, or cooling and *think before doing anything*. Don't alter the carburetor or file the coil points or tighten a nut here or there just to do something. Nine times out of ten the time is worse than wasted and the trouble made worse.

Furthermore, when an engine is working right do not alter anything during the process of cleaning and oiling. Give the engine enough good oil according to instructions; keep the parts which require it well greased, but do not take out the spark plugs and clean them just because you think they may be dirty, or experiment with the carburetor. As long as an engine runs right without undue noise, without missing, and without overheating, *leave it alone*.

There are just two essentials in order that a gasoline engine will start. First, there must be a compressed mixture of gasoline and air correctly proportioned and, second, a good hot electric spark. Given these two the engine will start. To keep it running it must be cooled and oiled. Most troubles are due to poor ignition, poor fuel supply or poor oiling.

The usual symptoms of trouble are, knocking, misfiring, overheating, smoky exhaust, fouled spark plugs, large gasoline consumption, poor pulling power on hills, oil becomes thin and watery, and loss of compression. Now, all of the troubles which these symptoms point to do not develop suddenly. Any-

one who has operated an engine for any time should be able to locate and remedy the difficulty long before the trouble becomes acute. Do not neglect loose bearings or loose cranks until they are past fixing. When anything goes wrong have it adjusted at once.

Finally, remember that you alone are responsible for the behavior of the engine. You must do all the thinking for the entire machine. You alone can supply the water and oil and gasoline or a new battery or mend a broken wire or tighten a loose connection. In short, the engine will supply the muscle for whatever is required of it, but you must supply the brains. If anything goes wrong, therefore, remember, please, that it is your own fault. Master the details of construction, master the theory of operation and trouble will not long reside in the engine of which you have charge.

Wireless Telegraphy

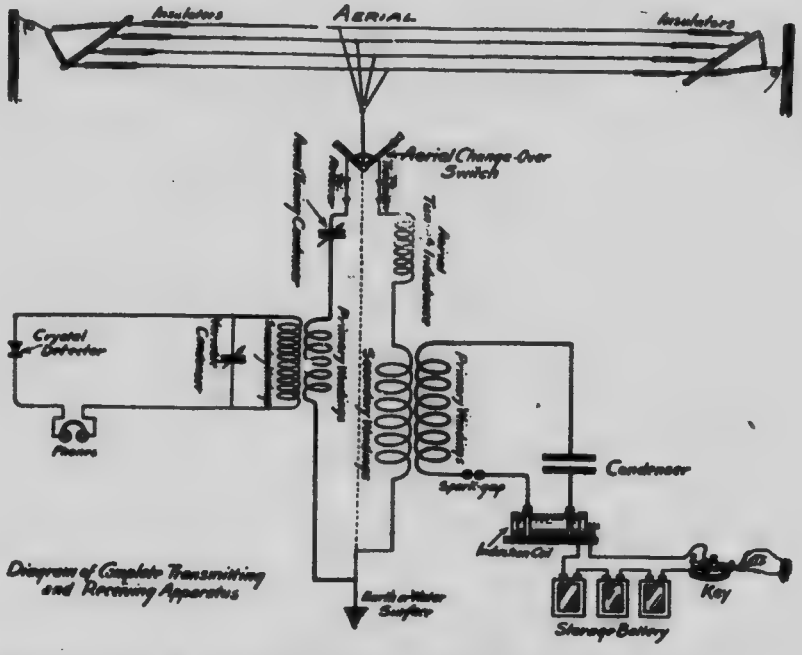
By J. E. Crankshaw, R.C.N.,
Wireless Operator, Halifax.

IN a brief chapter we shall attempt to deal with the details of the apparatus used and explain the general scientific principles of radio-telegraphy, as wireless telegraphy is called.

Aerial

The aerial consists of from two to six stranded copper wires spaced, in parallel with one another, at from 2½ to 3½ feet apart. The longer these wires and the higher they are above the ground or

water surface, the greater will be the amount of energy radiated and absorbed by them, with the result that messages will be received from and transmitted to greater distances. These wires are fastened horizontally across two vertical poles or masts.



Each end of each wire is insulated from the masts. To each of these horizontal wires is soldered another copper wire leading vertically downward, the soldered joints being made at one end or at the middle of the horizontal wires. These vertical wires pass through a "lead-in" insulator, (insulating the wires from the roof or deck), and are finally connected to the apparatus within the wireless station.

There are other types of aerials. The "flat-top" aerial, above described is the type almost universally used for ship service.

Every wireless station is installed with two sets of apparatus: 1. The transmitting set, for sending

out messages. 2. The receiving set, for receiving messages. A change-over switch is provided by means of which the operator is enabled to instantly change the aerial connection from the transmitting to the receiving position, and vice versa.

Wireless transmission is effected by means of electrical current. Such current may be generated from a dynamo, storage batteries, or any other source of electricity. On ships run by steam power, the transmitting sets are energized by a current from the engine-room dynamo. In case of a breakdown of the main set, an emergency set, operated by storage batteries, is installed on most vessels. The differences between the main set and the emergency are merely mechanical, the results produced being identical except that the main set will transmit signals to greater distances. We shall here explain the set operated by storage batteries.

Transmitting Set

The storage battery is connected to a manipulating key, somewhat similar to the telegraph key ordinarily used in land-line telegraph stations. (Follow diagram closely). The key is connected to a piece of apparatus known as the induction coil which in turn is connected to a device called the condenser. The condenser is connected to a coil of windings consisting of several turns of wire (called the primary windings). These primary windings connect with a spark-gap, which connects with the induction coil, as does the condenser.

Another coil of windings, (called the secondary windings) is placed in very close proximity to the primary windings, but this secondary coil does not touch nor is it connected to the primary. The degree of closeness or tightness of the primary coil to the secondary is variable by means of a device whereby the secondary windings can be made to slide in or out of the primary.

To the secondary windings is connected a third series of windings called the aerial tuning inductance. The number of turns or windings of the aerial tuning inductance which enter into the circuit is variable by means of a sliding-handle attachment. A wire also leads from the secondary windings downward to the ground or water surface, as the case may be. The aerial tuning inductance is directly connected to the aerial when the handle on the change-over switch has been pulled into the transmitting position.

Receiving Set

(*Dotted line in diagram shows division of transmitting set from receiving set.*)

When the change-over switch is in the receiving position, the aerial is directly connected to the receiving set. This set consists of a condenser, which is variable by means of a handle attachment. To the condenser is connected a series of coil-windings called the primary windings of the receiver. This series of windings, as in the transmitting set, is in very close proximity to, but does not touch—another series of windings, called the secondary windings of the receiver. As in the transmitter, the degree of closeness of the primary windings to the secondary is variable. The secondary windings are connected to another variable condenser which leads to a metallic crystal detector and lastly to the telephone. All above-mentioned variable devices in both sets are for the purpose of tuning the apparatus to emit the most audible note and for regulating wave lengths.

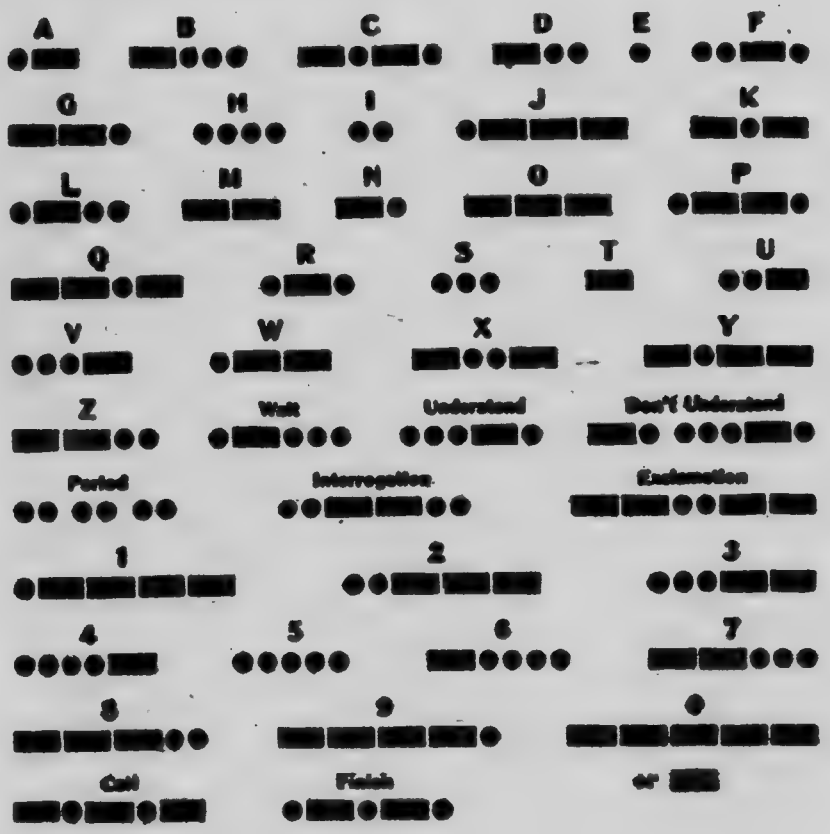
The Induction Coil

There are two kinds of currents of electricity: direct current and alternating current. The current flowing from a storage battery is direct current of a low pressure. But, in order to produce wireless signals, alternating currents of a very high pressure (high voltage) must be obtained. This direct,

low-pressure current from the storage battery is changed into alternating high-pressure current by means of the induction coil device. A current having a pressure of only a few volts is raised to a pressure of several thousand volts by the operation of the induction coil.

When the fingers press the key for a very short space of time, a sound is produced termed a "dot." When pressed for three times as long, a "dash" is made. Many combinations of dots and dashes form the International Morse Code of Signalling, which is used throughout the world in wireless transmission.

This code follows in part:



The sounds of these series of dots and dashes made by pressing the key of the transmitter are simultaneously reproduced and heard in the telephone of the operator who is "listening in," perhaps several hundred miles distant. He interprets these sounds, as he hears them, into intelligible words forming sentences, which he writes down at the same time.

As a comparison, in a pond of water and at opposite sides of it, are floating two pieces of wood. If one of these pieces of wood is struck with a hammer, or is in any way caused to disturb the water, it will be observed that a number of ripples or waves are sent out in every direction. These waves strike against the other piece of wood at the opposite side of the pond, causing that second piece of wood to be set in motion. Similarly, when the wireless transmitter key is pressed an oscillatory or vibrating electric current flows through the whole transmitting set to the aerial. Such current sets up millions of invisible electric waves. These waves travel into space in all directions at the enormous rate of 186,500 miles per second, and, striking against the aerials of every receiving set within a radius of a few hundred miles, induce an electric current to flow in every such aerial and receiving set. This current thus induced, energizes the telephone receivers reproducing in them buzzing sounds the same in length as those made by pressing the transmitter key.

For details of wireless phenomena read:

"The Elementary Principles of Wireless Telegraphy," by R. D. Bangay, published by The Wireless Press, Ltd., Marconi House, Strand, London,

For more technical treatment, we recommend:

"Handbook of Technical Instruction for Wireless Telegraphists," by J. C. Hawkhead, and H. M. Dowsett (1917), Publishers, same as above.

"Practical Wireless Telegraphy," by E. E. Bucher, published by Wireless Press, Inc., 42 Broad St., New York (1917).

CHAPTER XV

THRIFT

Boys Who Get There

By R. G. Dingman,
Managing Editor of "The Financial Post," Toronto.

"WHY They Got There" is the title of a fine booklet written by one of the splendid Sunday School and Y.M.C.A. men of the United States. He mentions a number of the most prominent men in the United States who have eminently succeeded in business. They are at the same time outstanding Christian men and are doing something worth while for the other fellow. Not one of these men, though, could have made a big success if he had not been "diligent in business—and thrifty!"

It is that word "thrift" that is really our subject here. If it does not at first sight look any too interesting, listen a minute, it is really thrilling!

What is thrift anyway? Well, it is merely care in managing your money and other property; going without something now, for example, in order that we, or someone else, may have more

at some later time. The importance of thrift is proved by the Thrift Campaigns conducted by many of the nations engaged in the Great War. Our Government made us save food. They made us, by taxation, save money. The Allied nations simply had to save their money to buy Victory Bonds, Liberty Bonds, etc., or the Allies would soon have been defeated—because they were not thrifty. The various countries had their National Registration Campaigns too, so that labor might be saved and spent where it would yield the most service. The Government also said that we must stop certain kinds of luxuries coming into the country. In other words, saving was necessary and we had to save whether we like it or not.

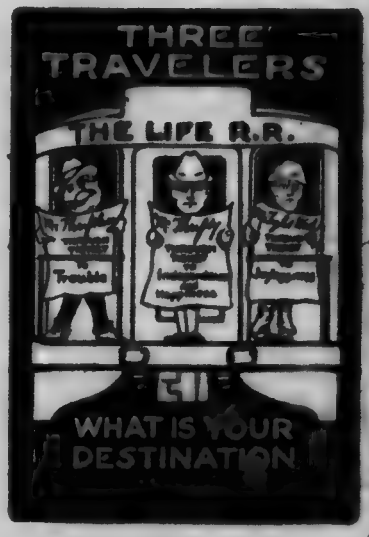
The world war was by some thought impossible because the nations could not stand the money strain. But nevertheless one of the marvellous things about the war was the way the countries, Canada for example, stood the strain and in addition saved and "banked" money. The Government figures showed that the people of Canada, month after month added ten million dollars or so to their total savings in the banks; a wonderful result of thrift!

We know how important are an army's reserves. How carefully the Allies' reserves were husbanded for use at later and more critical times! Banks, Insurance, Trust and other companies show their strength or weakness in much the same way—by the size of their reserves; that is, by the money and property they have saved and stored up ready for emergencies. Sometimes one of them fails, perhaps because not enough thought was given, in time, to putting aside a reserve for the future.

An experienced man has said that financial independence is merely a matter of "living within one's income," no matter, really, how large or how

small that income may be at the start. The really vital matter though is that the individual boy or man should always spend less than he earns.

Some figures recently compiled by the American Bankers' Association are startling in this connection. They show that out of 100 healthy men 25 years old, only one is rich by the time he is 65, four others of the 100 are then well-to-do, six others are supporting themselves. 54 are dependent on relatives or on charity, and 35 are no longer living. Of these living at 65, therefore, less than 17% are self-supporting or better, and 83% are dependent on others! The case for a boy being thrifty early in life and always saving something, no matter what his income, is clear, isn't it? And if these facts were only more widely known among Canadian older boys, that 17% would be quickly and largely increased. It is safe to say also that in the years to come there will be very few TUXIS BOYS in the 83% class of dependents.



Keeping within one's income helps, too, in another way. Perhaps some Canadian boys have already discovered that most employers are glad to know that a boy has a bank account.

These experienced employers are more ready to give a good position to a boy who already shows he is thrifty. Such a boy is much more likely to handle his employer's money and business prudently than is a boy who cannot make a success of his own affairs.

There was not much saving when the race was in its nomad days. When food was needed an animal was shot or wild fruit or nuts were plucked. Did

you ever stop to think how far away we are from that stage? Every building in our cities, every farm house or barn, every railroad train, every ship on the ocean, is there because *somebody saved money*, or was thrifty with his labor at a time when he might have spent it for immediate pleasure. All the great businesses of Canada—the great railroads, banks and loan companies that lend money to farmers and others, the great universities and schools, the museums, the flourishing cities and towns, are in existence because *our forefathers saved when they might have spent.*

A new company starts business in Montreal or Winnipeg, say, to manufacture goods urgently needed by Canada and Britain in the war. The manufacturer goes to the bank and borrows some of the money that hundreds of other people had been saving and depositing there. A few months later, *because of the thrifty habits* of boys, working men and others in Canada that made possible this loan by the bank, fuses, shells or hand grenades are shipped across the ocean in thousands. So thrift helps in a world-wide way as well as in individual existence.

Great Britain has long been the leader in the business and financial world; she did, in fact, most of the war financing for the Allies in the first three years of the struggle, and the war went as successfully as it did in those early and awful days largely because men and women of Britain, for the past scores or hundreds of years had *saved* part of their money instead of spending it all at the time.

Take the two great financial groups in Canada—the banks and insurance companies. Canada would be of immeasurably less importance in the world if these institutions did not exist. They lend the money used in almost every worthy enterprise and they do exist because the people of Canada have saved a part of their money and either deposited it in the banks or buy insurance policies. A boy of

fifteen can take his savings to a bank and get three per cent a year added. He can take them to some trust company and get four per cent a year, with the result that if he saves and deposits a dollar a week he will have in that trust company at the end of twenty years $1,586.00. Or a boy of fifteen years of age can take his money and buy an insurance policy that will bring him in some $1,500 twenty years later and will give his mother over $1,1[illegible] if he dies before that time.

To sum it all up, thrift [illegible] within one's income, saving a little every week, whether it be from an allowance or one's earnings. The results of this prudent spirit are incalculable in a boy's character and in his business or profession later. He can help his home. He can help his church. He can get ready to establish a home of his own. He can help his nation by having some money saved up for use in national emergencies. Ten years from now, for example, it will be a great satisfaction to a boy now fifteen or eighteen years old to know that with his savings he had bought a Victory Bond or two and had helped the best principles in the world to come out on top in a world war. Many of the best men in Canada will tell you, too, that the thrift habit pays immensely in the pleasure it gives one to have money to give to the great causes that need help.

The TUXIS BOY who will earn and save with a view to his own financial independence later, with a view to helping his home, his church, his country, helping Red Cross and Red Triangle Funds, and missions, will find a joy in life that he could not possibly get by spending all his money at the time and failing to develop the prudent or the "help the other fellow" spirit.

CHAPTER XVI

STORY AND SONG

The Art of Story-Telling

By John Bradford,
Community Secretary, Montreal Young Men's Christian Association.

WITHIN the past few years there has sprung up a revival of interest in the world-old art of story-telling. In the days of the Tales of Homer and the Arabian Nights this art was followed by many as a profession and was regarded as being of great importance. The invention of printing and the making of many books, which made word-of-mouth preservation no longer necessary, gradually did away with the story-teller and the world suffered a great loss. For all the world loves a well-told story.

In America the revival of interest has spread over the whole continent. There are now many story-tellers' Leagues. Courses are given in universities, schools and colleges, and the Library Story-Telling Hour has become a fixed feature. Boards of Education are adding trained story-tellers to their teaching

staff and a playground would hardly be worthy of the name which did not have a regular time set apart every day for stories.

The small group is the ideal place for story-telling, especially for beginners in the art. To make a start the Mentor or some outside leader might tell some stories and point out the important things to aim for in telling a story. If the minister is a good story-teller he may be secured to give a demonstration to the square or be encouraged to give some short stories for boys and girls preceding his sermon on Sunday mornings.

TUXIS SQUARES Classes should secure a book or two from the Public Library or buy one or two books with their own funds for the Sunday School Library. Members should then take turns in preparing and telling a story. As soon as a few stories have been learned the members should volunteer to help the junior clubs and classes with their programs by telling these stories.

Story-telling offers one of the finest and most enjoyable means of brightening the lives of others. Not only will it help us to entertain our friends, but we may by this means render any useful service in Sunday School, Church Clubs, Public Schools, Camps, Hospitals, Homes for Children, etc.

It is by constant practise of the art that you will become proficient and thus provide a source of very great pleasure to yourself and an opportunity for real service to others.

The following books will help to give an insight into this fascinating old art:

"Story-Telling, What to Tell and How to Tell It," Lyman, 75c.

"Some Great Stories and How to Tell Them," Wyche, $1.50.

"Mystery Tales for Boys and Girls," Smith, $1.50.

"Many Adventures of Robin Hood," Pyle, $3.00.

"Buccanneers and Pirates of Our Court," Stockton, $1.50.

"Modern Heroes of the Mission Field," Walsh, 50c.

Lists of stories and where material may be found can be secured, as well as Story-Hour Courses which contain outlines for story-telling from the Carnegie Library, Pittsburgh, Pa., Price 5-15c. copy.

True Stories Worth Telling

By Frank Yeigh, Toronto,
Lecturer and Journalist.

WHEN the Tuxis Square gathers around the camp-fire, and TUXIS BOYS watch the sparks tracing a million fantastic shapes against the darkness, and when the time for stories has come again to close another day in camp, what better could be told than a few from the host of tales of the Royal North-West Mounted Police. There are hundreds of true stories of their sacrifice and heroism as thrilling as any a fiction, only few of which can be suggested within the confines of your Manual.

The Royal North-West Mounted Police are a part of the development and occupation of the great west country of Canada. They have made for themselves an undying place in the romance of Canadian pioneer life. Stories of this group of men who have performed a unique ser-

vice for Canada, and, in its performance, have braved the frenzies of man and nature, are replete with action and interest and have now become of double value with the passing of the red coated "riders of the plains" into the maelstrom of the world's titanic struggle.

Stories of Canada's Mounted Police

Canada has one of the most unique semi-military forces in the world in the Royal North-West Mounted Police of the Canadian West, to give it its full, official title.

It is unique in its personnel, in its achievements in enforcing law and order, and in its patrol of an area as large as half a continent, covering a thousand miles from south to north, from the Canada-United States boundary to the Yukon and the Mackenzie Rivers and twice that distance from east to west, from Hudson's Bay to the Rocky Mountains and the Pacific coast.

This constabulary force was organized over forty years ago, as the instrument through which the "Pax Britannica" was to be carried into and across the Canadian West, then truly the great Lone Land of North America. The vast stretch of territory encircled by three oceans, was literally "No Man's Land,"

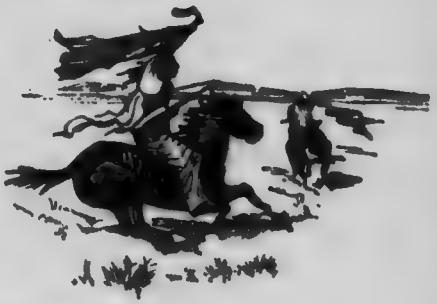
dotted at widely separated parts by a few Hudson Bay carters and the roaming redman.

Winnipeg was only a village of log cabins set at haphazard on the floor of the spacious prairies. The sister prairie cities had not yet been born; there was neither Brandon nor Saskatoon, Regina nor Calgary, and only a meagre settlement to represent Edmonton. It was, therefore, a red letter day in the history of the North-West when on July 8, 1874, 279 men started on their famous overland march toward the Rocky mountains, across leagues of plains that now form the trio of prairie provinces, each as large as many a European country.

Up to this time there had been an Indian and half-breed uprising and much lawlessness. Government on a stable basis had not yet been established. Ottawa, as the seat of authority, seemed, as indeed it was, a long way off. Under these circumstances the effect of the appearance of mounted government troops was at once felt. It was graphically put by an old Indian Chief, who, speaking to the "red coats" at a council meeting of his tribe, said: "Before you came, the Indian crept along. Now he is not afraid to walk erect." For nearly half a century, therefore, both red and white man have been unafraid to walk erect in any corner of this far-flung domain between the plains and the mountains; between the international boundary and the Arctic Ocean.

The significance of this fact is increased as one realizes the smallness of the force numerically and the vastness of the area under their police control—five times the size of Great Britain, or as large as Central Europe.

The Mounted Police gradually grew in strength until it nearly reached the thousand mark, separated into over a hundred and fifty detachments in a score of divisional posts. Rarely in the history of national policing, one may repeat, has such a small force patrolled such an extensive area or exercised jurisdiction over so many diversified peoples, for be it remembered that one year's immigration into Canada before the war included fifty different nationalities or peoples.



Rarely, too, have the results been so marked in the establishment of law and order under conditions where lawless elements might easily have held control. Certain undesirable characters always find their way to a new land, who assume freedom from legal restraints and who, therefore, oppose any change. But changes came with the advent of the red-coated policeman, with an inexorableness that knew of no thwarting. The Mounted Police may now be said to have completed the task it originally essayed so far as the frontiers of the prairie provinces are concerned, while it has been worth many times its cost as an object lesson of the power and authority of the government existing behind all real civilization.

When one comes to learn of the daily life and work of these sturdy rough riders of the plains, it reveals a rare courage and fidelity to duty as well as a romance of action in the overcoming of seemingly unsolvable difficulties and of herculean tasks performed—and that without self-advertising. No man is quite so modest or impersonal as the Mounted Policeman and the very brevity of his reports often cover material for a stirring tale of daring. The biggest task is quietly disposed of as "all in the day's work."

Let us recall samples of these stories of the barracks and the plains. Some have come down as traditions, but traditions that are true; others will have to be dug out from dusty blue books, but all throb with life and action.

The Mounted Police performed their first great service in suppressing the lawlessness that belonged to the period when the Canadian Pacific Railway was being built, in the early "eighties." One can still see the deserted cabins of the construction gangs, the discarded dumps and shovels and the temporary sidings of those pioneer days in the Canadian West when the camp knew no law but its own. Readers of Ralph Connor's "Black Rock" or the "Sky Pilot" will have this period pictured in fiction, though based on fact. Many story is still told by the surviving old timers the quieting effect of a mounted policeman on turbulent crowd bent on mischief. Authority vealed its power when represented by a man ent on doing his duty, despite all odds.

Another period came with the second Riel Rebellion of 1885, when new conditions had to be faced and a more dangerous enemy dealt with. This chapter in the life of the R.N.W.M.P.—the five-lettered force—is an unique one, calling for the maximum of vigilance against a wily foe that knew every play in the game. But here, too, the prowess of the police cavalry was manifested and their invincibility shown. The redman was no match in the last analysis for the white man.

These law-keeping rovers of the mountain were invaluable when the great rush to the Yukon and Klondyke took place in 1889-1900. Their services were in constant demand, not only in their police capacity but to succor the helpless and to befriend the unfortunate many. Many a gold-seeker owed his life to his uniformed rescuer, while living conditions were

made possible by the power represented and exercised by the ubiquitous policeman.

The deeds of the individual soldier-policeman deserve to be told and re-told for they tell their own story, as has been said, of fidelity and fearlessness, of bravery and gentleness and of absolute devotion to duty. A thousand-mile overland trip to run down a criminal; another thousand-mile order to "mush" it by dog-team and komatik or canoe on a mail-carrying expedition to and from Herschel Island, in the Arctic Ocean, are not infrequent and the blood flows faster and heart beats quicker as the tales are heard or read.

One such journey was made during the winter of 1910 by Constable Sellers—a trip of 995 miles, in company with an interpreter and an Eskimo, in order to trace a ship lying in the Arctic waters and to collect the customs duties. With his two companions and a dog team, Sellers left the west coast of Hudson Bay in February and returned on April 19th, having been exposed for two months to the full rigors of an Arctic winter. Blizzard after blizzard was encountered, the men taking shelter in the Eskimo igloos or ice huts and feeding on wild deer. Even then the meat had very often to be eaten frozen, because the alcohol and wood gave out.

Sellers' diary, a typically modest report, only hints at what lay behind the arduous journey: "We have only fifty pounds of deer meat, two pounds of pemmican, and six pounds of boiled meat for ourselves and the ten dogs, so we must find natives. Very cold day; I had both my feet badly frozen. My footgear is in a very bad state—wet and worn out. We were compelled to breakup some barrels to cook food, as we had been subsisting on frozen meat for the last three days.

"Terrible snowstorm. Impossible to go out looking for natives. Our dogs are getting hungry, as they have had nothing for three days. We cannot possibly give them anything out of wha.. small supply we have for ourselves. My feet are very sore, the result of frost burns.

"Bad storm, but not nearly so bad as yesterday. I sent Ford and Tupealock out to look for natives. They returned at 5 p.m. bringing us information that cheered us quite a little. The ship, they learned, was at Melachuseetuck, the place where ghosts chase women. They brought some meat for the dogs and said the natives, who belonged to the Nitulick tribe, would come in the morning with as much meat as they could spare.

"Still storming. Finished up all our meat for breakfast. About noon the natives came in, bringing about four hundred pounds of meat, which I purchased from them. It was nearly all seal meat. We found it rather high all by itself, but hunger is a great sauce."

In due course the party reached the vessel for which they were searching and received a hearty Scottish welcome from her commander, Captain Murray, who fitted them out with stores for the return journey.

Another remarkable journey was that made by Corporal Field, of the Fort Chippewyan Post. One day he received a summons to attend a case of lunacy farther north. It only takes a few lines of type to chronicle the fact, but it took Field six weeks of travel for a distance of thirteen hundred

miles, through the snowy wastes of . On the way down country, the maniac ame so violent that he had to be strapped to the sleigh, fighting his keeper, refusing food and otherwise adding to the difficulties of the plucky corporal. Not an hour of the day or night was the keeper free from his charge, as he battled no less with unreason than with the angry elements. Yet the Government report merely states that the demented man was safely handed over to the asylum authorities. Field had done his duty, that was all.

Or, take the case of Inspector Generoux, of Prince Albert, who traveled seventeen hundred and fifty miles by canoe and dog-train through the farther north to inquire into a case of alleged murder. He was absent one hundred and thirty-two days. At the inquest, he, as coroner, found that the death was accidental, but the trip is an illustration of what lies in the program of these hardy men of the north, showing that supposed crime will be dealt with no matter what the cost or how dangerous the case. One such murder case cost the country nearly one hundred thousand dollars.

On December 27th, 1905, Corporal Napley left Dawson City with a detachment of police destined for Fort McPherson, on the Peel River, five hundred miles distant, across mountain ranges

totally unknown to the travelers. These plucky pathfinders were entrusted with His Majesty's mail, traveling by dog-team. The party arrived back on March 9th, having successfully covered a thousand miles of trailless territory. The corporal's modest report on this great journey well represents the best traditions of the force.

Arriving at Fort McPherson, what did they find? A police post in the land of the midnight sun, with a native population of Eskimos and a handful of Hudson Bay men. Two hundred miles farther north lies Herschel Island, occupied by the police since 1904, where toll is taken from the United States sealers and whalers and where the British flag flies at its most northern point, within twelve hundred miles of the North Pole. These far-flung lines of police power strikingly illustrate the vastness of the domain then under control.

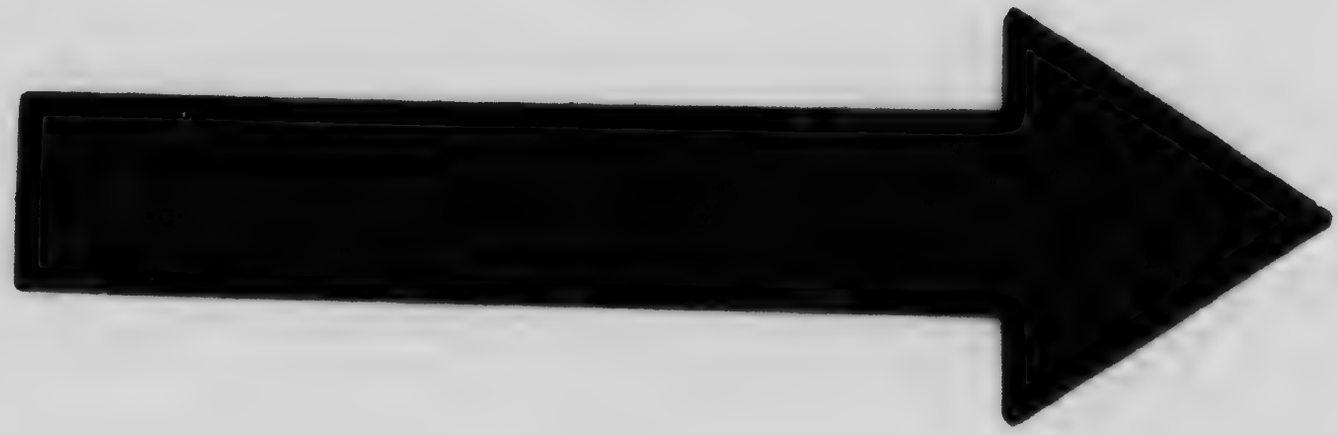
The work of the police nearer the United States boundary was certainly marked by variety. In the ranching country, where prairie fires are a menace, the lonely soldier in red must needs act as fire warden. One October day, Constable Conradi was having his dinner at an Alberta ranch, when he noticed a terrific prairie fire sweeping across the country from the south-east. "Are there any settlers in danger?" was his instant inquiry.

"Young has a wife and ten children, but I would not try to make his place, the fire is coming up at such a pace," replies the rancher.

Then Conradi knew his duty. Fighting the flames with the utmost heroism, for the wind was blowing a gale and the fire was fierce in the extreme, at last Conradi actually ran through the wall of flames, emerging nearly suffocated, with his hair singed and his coat on fire. Finding Young through the thick smoke, where he had taken refuge beside a slough, Conradi seized two of the youngest children, the others followed and all were saved, though their brave rescuer was rather badly burned. "My wife and family owe their lives to Mr. Conradi and I feel, with them, we shall never be able to repay him for his brave conduct," writes the rescued man.

Horse and cattle thieves are sometimes found near the boundary. A message came to the force headquarters one New Year's Day that a band of horse thieves were operating the country beyond Saskatoon. It was a meagre clue, but three men set out in a raging snow storm and on the following day found the ringleader in a half-breed settlement sixty miles out. They were three against eight, some of whom showed fight, but the moral effect of the King's uniform helped to make the arrest. The prisoner's friends offered to bribe for his release, but a Mounted Policeman cannot be bought.

One journey had, however, its fatal results. In the middle of winter it was imperative to send a message to a distant post. One corporal volunteered and set forth in a blizzard with the theromometer registering thirty degrees below zero. The despatch was never delivered. The policeman never returned. After the snow had gone in the spring an Indian found a skeleton clad in a faded red uniform. The fatal despatch was in the pocket, and on it were written the words: "Lost. Horse dead. Am trying to push on. Have done my best." His dying hand had written a better epitaph



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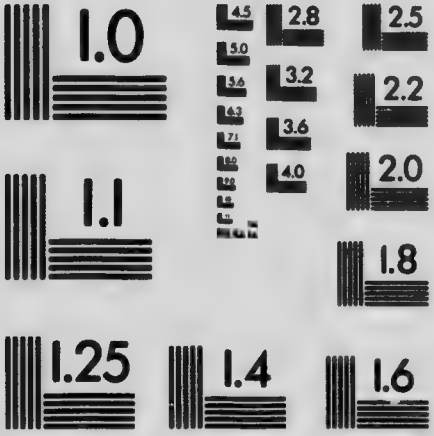

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than any that "storied urn or animated bust" could proclaim to his memory.

The Mounted Police are, moreover, of necessity, great explorers and travelers. One detachment opened up a pack trail from Edmonton to the Yukon, a distance of nearly a thousand miles. "The men working very hard under very trying circumstances," is the testimony of the officer in command of the work. Unforeseen difficulties in the nature of unfordable streams which had to be graded and extensive windfalls through which the trail had to be literally sawn were encountered, as well as many blizzards and storms and consequent exposure to the elements. Rest houses have since been built every thirty miles and the distance marked every two miles. The trail was made so that it may later be widened into a wagon trail if necessary. A trail from the Peace River to the Yukon, several hundred miles in length, has been constructed, the work of a small detachment of twenty-nine police.

The obstacles encountered were those incidental to road-making in a mountainous country—steep ascents and descents, rivers and streams, muskegs and soft places, forested and fallen timber; the difficulties were the shortness of the season, work being only possible for four months, the forwarding of supplies and the necessity of haste; the discomforts were from flies, rain, and cold. Owing to the luxuriant growth being saturated with a heavy dew, the men were scarcely ever dry, even if the day were fine. However, there were few accidents and little sickness. The horses suffered most because of the hard work and the scarcity of food at times, but no fatalities ensued.

One of the most recent exploits of the force was the bringing of two Esquimaux from the far north to Edmonton and Calgary a distance of five thous-

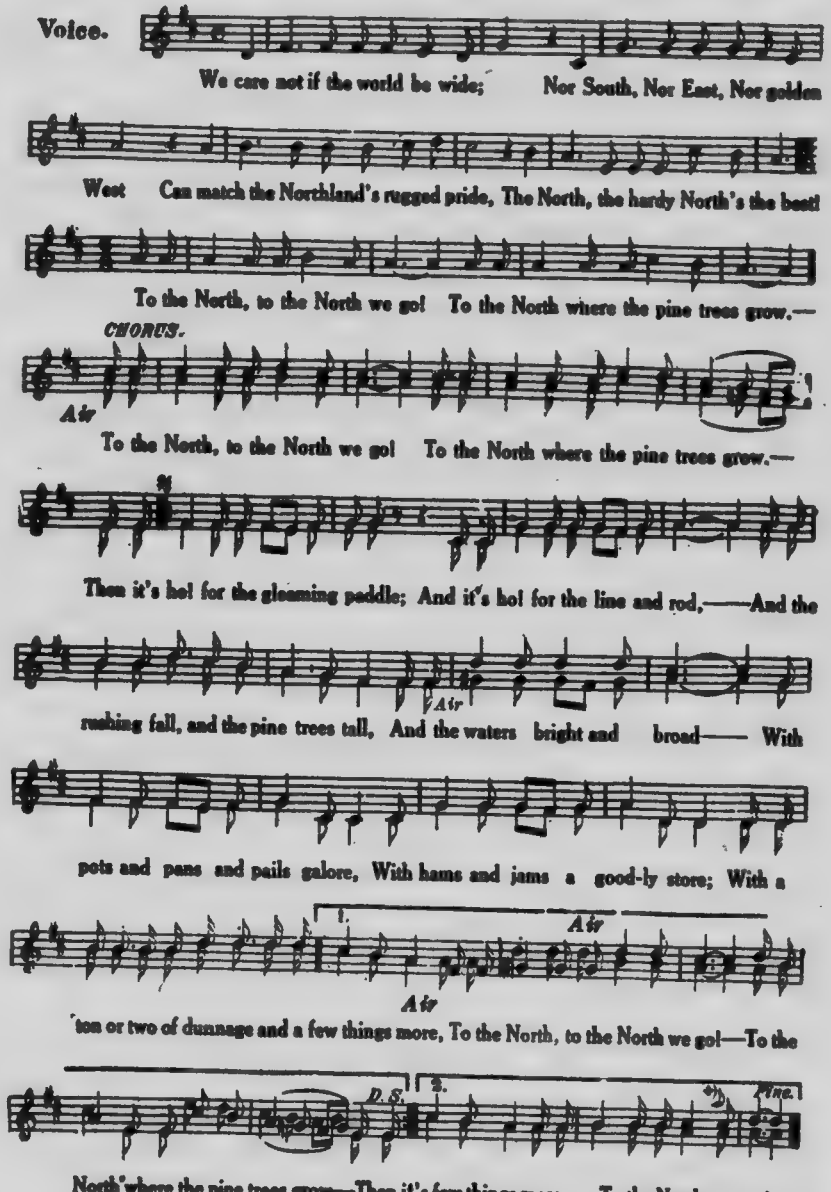
and miles on the charge of murder. It took a force of three men two years to locate and secure their men; Sinnisiak and Ululiak, who were finally acquitted. But the whole trip to and from the outer ridge of the world was remarkable evidence of the far-reaching arm of the law as interpreted by the Mounted Policemen.

To-day the famous force has undergone a change due to the war. After years of straining at the leash to enlist they have been permitted to enter the larger arena of action and their places are being taken in part by recruits.

It may mean the ending of the Red Order and the passing of many of these Riders of the Plains, as they have been known for nearly half a century. If so, they have written a fine record on the pages or our western. Canadian life; the two million square miles area they patrolled (with only one policeman to 2,400 square miles) have long been one of the best-policed and law-abiding sections of the world.

TO THE NORTH!

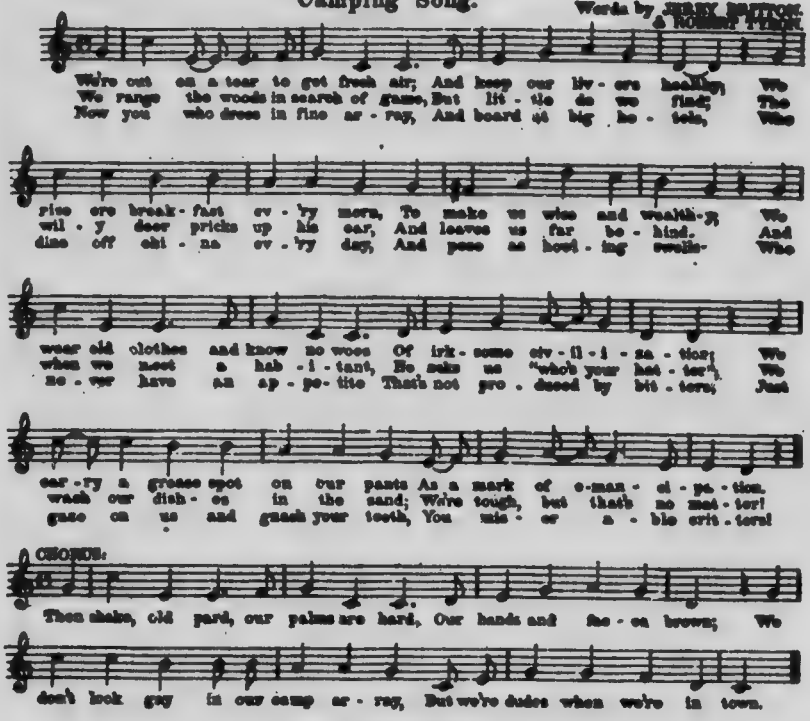
Words by JOHN D. SPENCE. Music by JAS. EDMUND JONES.



WE'RE OUT ON A TEAR.

Camping Song.

Words by JERRY BOSTOCK.
& ROBERT FISHER.



TO THE NORTH

Who yearns for palmy Southern seas?
Who longs to dream the languorous hours?
To fritter in luxurious ease
His vigorous manhood's early powers?
To the North! to the North we go!
To the North, where the fresh winds blow.

Who would not flee the whirl and strife,—
The anxious brow, the c aseless strain,
To drink again the milk of life,—
To feel himself a child again?
To the North! to the North we go!
To the North, from the debts we owe.

Who longs for dainties rich and rare,
For cooling wines and liqueurs hot,—
That once has known the simpler fare
That fills the camper's generous pot?
To the North! to the North we go!
To the North, where the black bass grow.

Let others sail the sluggish streams
That murmur through the quiet night.
Give us the glorious sun, that gleams
On curving green and foaming white!
To the North! to the North we go!
To the North, where the torrents flow.

So, till with age our spirits flag,
And hearts beat fainter, year by year,
The North shall fling from crag to crag
The echo of our boisterous cheer.
To the North! to the North we go!
To the North, to the North, Yo ho!

For full accompaniment for "To the North," see Univ. of Toronto Song Book, p. 162

TUXIS BOYS' CHORUS

Music by J. ERNEST LAWRENCE

This chorus may be sung in the key of B Flat if desired. It is more snappy and impressive, however, written in the key of C.

The Omaha Tribal Prayer

Harmonized by PROF. J. C. FILLMORE.

(Reprinted by permission from the Woodcraft Manual of the Woodcraft League of America.)

Translation:

Father, a needy one stands before thee;
I that sing am he.

The above sung in unison is very impressive if the singers, ranged in a circle, stretch their arms upwards and sing all but the last three notes with faces upturned. The rendering must be slow and solemn, finishing with a sweep of the arms till they touch the ground.

CHAPTER XVII

GROUP GAMES

Group Games

By G. P. Brandon,
Boys' Work Physical Director, Montreal Young Men's Christian Association.

AT one time play was considered only as a means of keeping boys out of mischief, or giving adults an opportunity to follow their own pleasure. To-day, we cultivate play for its educational value. Games and recreation are now regarded as having a direct educational bearing on the development of virile manhood.

"As a boy plays, so will he live." Play develops sportsmanship, courage, self-control, true and quick decisions—the manly qualities that stamp a boy as a trained, well-organized individual. Play saves him from degeneracy into an erratic, snap-judgment type of man unorganized in his activities and with neither the will to do, nor the will to inhibit.

The bully is the weakling. It takes strength to be a gentleman. As games progress from the simple to the more complex and demand greater control and team-work, the place of the Christian

spirit developed through the TUXIS BOYS' Program assumes a larger place in the realm of play.

In compiling and arranging the following games, the Square whose Mentor has had little training and which has scant equipment has been kept closely in mind. They are set forth in the hope that they will stimulate your TUXIS Square to enjoy the benefits accruing from Group Games and to extend the interest to more exhaustive works.

These games have been gathered from many sources. Some of them are original, the result of some years of work as a physical director among boys in the Y.M.C.A., in others the phraseology has been altered to suit the purpose of this Manual; others again have had some additions made to give them greater interest. I wish to acknowledge the use of the games re-printed from Miss Jessie Bancroft's very complete work, "Games for the Playground, Home, School and Gymnasium," and for suggestions from various volumes of "Physical Training."

Tag Games

Cross Tag

One boy is chosen to be IT. He gives warning and points to another player and immediately chases. A third player may run at any time between the one who is IT, and the one being chased, thus becoming the object chased. This goes on until the original one chosen to be IT succeeds in touching another. Fake attempts to cross between the chaser and runner add to the excitement of the game.

Cross Tag in Pairs

This game is similar to simple Cross Tag, except that the boys run in pairs. Each player linking his arm with another player, and running in that manner. They must not at any time

let go arms to evade being tagged. This develops the spirit of co-operation.

Ostrich Tag

One player is IT. The remaining players are chased and tagged at any time, except when standing on one leg with right arm under right thigh and hand holding the nose. It is difficult to stop running quickly and assume this position and hold it. The players have to move frequently as the position is difficult to hold.

Oriental Tag

One player is IT. The other players are chased. The only safe position is on the knees with the head bowed down on the folded arms, in a similar position to the posture of worship assumed by orientals.

Squat Tag

One boy is IT. A player is chased and, when in fear of being touched, may squat, which saves him for the time being, but when this method of safety has been used (say three times) as decided at the beginning of the game, the player must then continue to run or be tagged.

Horse and Rider Tag

One player is selected to be IT. The remaining players run, trying to mount (jump straddle another

player's hips, with arms over shoulders) or to have someone else mount them in like manner. This position of the horse and rider makes them both safe from tagging.

Disengaged players should be encouraged to mount riders, thus leaving the horse free to be tagged or seek a new mount. Encourage riders to dismount and go between other pairs of horses and riders, making it necessary for the rider to seek new mounts, or, for the horse to become rider to save himself from being tagged.

All-Fours Tag

The TUXIS Square is turned loose, and allowed to run all over playing space. The one selected to be IT travels around on all fours (hands and feet) trying to tag someone. He may tag a person with either hands or feet. The tagged one then gets down on all fours and continues the game in a similar manner.

Vary by having every tagged one remain on all fours and assist in the tagging, until the whole square is tagged.

Top Tag

This game is similar to common tag, except that person tagged must place his hand on the part of his body which was touched in tagging and keep it there until he touches another player.

(Note) Try to touch player on the back or legs, making it difficult to run in that position.

Three Deep Tag

20-30 necessary to make it interesting. Players form in two circles, one directly behind the other. Two players are left free, one to be IT, and the other to be chased. The player chased passes in and out around each

Three Deep Tag

pair and stops in front of some pair, thus making three deep (one behind the other). The runner is then safe, but the outside player of the three is then chased, until he places himself in front of some other pair.

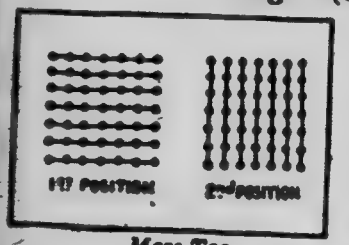
Three Deep

Maze Tag

All but two of the players stand in parallel lines or ranks, one behind the other, with ample space between each two players and each two ranks. All the players in each rank clasp hands in a long line. This will leave aisles between the ranks and through these a runner and chaser make their way.

The sport of the game consists in sudden changes in the direction of the aisles, brought about by one player who is chosen as leader and stands aside, giving the commands, "Right face!" or "Left face!" at his discretion. When one of these commands is heard, all of the players standing in the ranks drop hands, face in the direction indicated and quickly clasp hands with the players who are then their neighbors on the right and left. This brings about a change of direction in the aisles, and therefore necessitates a change of direction in the course of the two who are running.

The success of the game depends largely upon the judgment of the leader in giving the commands, "Right (or left) face!" They should be given quickly and repeatedly, the leader often choosing a moment when the pursuer seems just about to touch his victim, when the sudden obstruction put in his way by the change in the position of the ranks makes necessary a sudden change of direction on his part. The play continues until the chaser catches his victim, or until the time limit has expired. In either case two new



Maze Tag

players are then chosen from the ranks to take the places of the first runners.

It is a foul to break through the ranks or to tag across the clasped hands.

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Partner Tag

All players, but two, hook arms in couples. The two free players are chaser and runner. The runner may save himself by locking arms with either member of any couple. When he does so the third member of the couple becomes the runner and can save himself in like manner. If the runner is tagged he becomes IT and the chaser becomes runner.

The couples should move around, thus complicating the runners as much as possible.

Tag Games Requiring Apparatus

Hang Tag

One player chosen IT. He may chase any players except those who are immune from tagging, by hanging to a tree, fence, piece of apparatus, or leaning over the same with feet free from the ground. Players should move around to different places to keep the game interesting.

Dead Spot Tag

The boys form a circle with even numbers in one team and odd numbers the opposing team. Place a small mat or similar object of such size as can be jumped in the centre of the circle. This is the Dead Spot. The circle sways and pulls, each boy trying to cause his opponent to step or fall on the dead spot. Each one stepping on this spot retires from the game. The team having

the largest number of players remaining in the circle at a given time wins.

Mat Tag

Place mats on the floor, some distance apart or enclose spaces on the floor by marks. One player takes his place in the centre of floor with a ball and tries to hit one of the other players while they cross from one mat to another, the mats being places of safety. A player hit while passing from one place of safety to another becomes IT.

Swat Tag

Secure a large bath towel. Tightly roll and tie with strings, making it represent a policeman's baton as to size and shape.

ORIENTAL TAG

On knees, head down, with folded arms.

The players, except the one to be IT, form a circle, with hands behind their backs, palms open. The odd player runs around the circle carrying the baton, which he drops in the hands of any player in the circle. That player immediately turns to chase his right-hand neighbor, beating him around the circle and back to his own place.

The first player with the baton then joins the circle and the second player, after chasing his right-hand neighbor around, places the baton in the hands of some other player.

Relay Races Without Apparatus

Simple Relay

Divide your players into teams of equal number—less than six on a team is not wise. The runners on each team stand at one end of the playing space, either in a line, one behind the other, or side by side, according to playing space. At a given signal No. 1 of each team runs to the opposite side of the playing space and returns, touching No. 2 who continues the race until all the team has run.

It may add interest to number the teams, at the beginning of the race, as 1st, 2nd, 3rd, etc., places, and as each succeeding race is run place the teams in the order of 1st, 2nd, 3rd, etc., according to finishing positions. Team No. 1 will try to hold 1st place, and, of course, work harder.

This may be used with as many as ten teams, or, one hundred players, if the space is large enough.

Combination Relay

Use the formation as in the simple relay. Each team, however, divides into two, No. 1 and 2 of each team running together with arms linked all the time they are running. In other words 1 and 2 link arms, run to given point, return, touch 3 and 4, who do likewise, to the end of the team.

Variations in the above game are as follows: Keep same formation as above, only increase the number running in combination in each race, until the whole teams runs, linking arms. In the latter case, instead of the group trying to turn with arms linked, which might cause the one on the end of line to be thrown, have the players unlink arms at end of course, turn around, and relink arms, before returning to starting position. A team to complete the race must have all its players back to the starting point with arms linked.

Leap Frog Relay

Use the same formation as for the simple relay. No. 1 in each team squats either forward or at right angles to his team, hands on thighs. No. 2 does a leap frog jump over No. 1 and takes a similar position as No. 1 at such distance from No. 1 as to allow a player to alight between the two. No. 3 leaps over No. 1, then No. 2, etc. This continues working forward from the rear of the line until the whole team have covered the course and returned to starting position.

Animal Imitation Relay

Teams line up as for simple relay and the race is run imitating various animals. No. 1 covers the distance, returns, touches off No. 2, who does likewise. The distances should be short for this form of running. It affords considerable amusement. The following are some methods of running this relay:

Frog—Hopping on all fours.

Horse—Trotting, galloping, racing, on all fours.

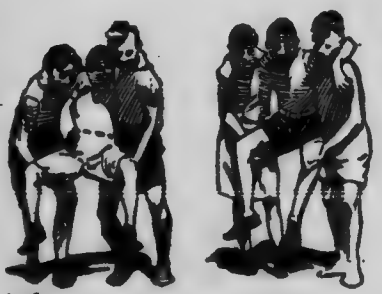
Elephant—Knees stiff, feet and hands on the floor, with hands and feet as close as possible.

Seal—Pulling the body by the hands, legs trailing.

Supine position—All fours with face up.

Transportation Relay
(FIRST AID CARRY)

The boys should have the same formation as for ordinary relay. Nos. 1 and 2 in the line pick up No. 3 by placing one arm around shoulder, other arm under thigh. Carry in this manner across playing space where No. 1 remains. Nos. 2 and 3 return and carry No. 4 over, etc., until the whole squad is transplanted.



TRANSPORTATION RELAY

Horse and Rider Relay

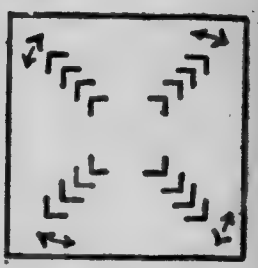
Each team divided into two, standing one line behind the other. At a given signal, the rear line jumps astride of front line (arms over shoulders, legs around hips) run to end of course, dismount, the rider becoming the horse, and vice versa, for the return trip. The winning team must have all their players back to starting place. (Note—This may be run for individual pairs instead of teams.)

Crawl Through Relay

The boys should be in rows, one behind the other, stride stand position. First in line runs around to the rear of the line, crawls between the legs of his team, returning to original position, which is the signal for the second in line to crawl forward to front, run around to the back of line and crawl forward again to his own position in line. This continues until the last player in the line has crawled through and returned to his original position.

Circle Relay

The players stand in three or more divisions in single file, facing to a common centre. In this formation they radiate like the spokes of a wheel. On a signal from a leader, the outer player of each file faces to the right. On a second signal, these outer players all run in a circle in the direction in which they are facing. The object of the game is to see which runner will first get back to his place. The one winning scores one point for his line. Immediately upon the announcement of the score, these runners all step to the inner end of their respective files, facing to the center, the files moving backward to make room for them. The signals are repeated, and those who are now at the outer end of each file face and then run, as did their predecessors. The



CIRCLE RELAY

line scoring the highest when all have run wins the game.

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The Weaver's Relay

Divide the boys into two circles for competition, each one in the circle grasping the hands of his left and right neighbor. One person from each circle is chosen as starter. He drops outside the circle and at a given signal begins racing around the circle going into the circle under one pair of arms and out through the next, until he reaches his own place where he touches off the next weaver on his right. The team whose last runner first reaches the starting place wins.

Antelope Race

Divide the boys into teams of six or eight players. Each team runs in single file. Each player, except the leader, has one or both hands clinging to the waist or belt of the runner ahead. They run to the end of the playing space and return. Pulling down or breaking apart disqualifies the team. The team returning first intact wins.

Relay Races Requiring Apparatus

Medicine Ball Relay

Divide the Square into teams of equal number. Teams to face the same direction and in parallel lines, stride stand position. No. 1 in each team has a medicine ball which he passes between his legs down the line. The ball receives fresh impetus as each player adds his push. The last man in line receives the ball, carries it forward to the beginning of the line and starts it again between his legs. This continues until the first player to pass the ball has received it in turn at the rear of the line and carried it forward to the starting point.

VARIATIONS

(a) Same formation as above. Greater space is required between the players. The ball passes between the legs of No. 1, and over the head of No. 2, alternating this way down the line, the last player running forward as before.

(b) Same formation, but players in a full knee bend position. Player No. 1 passes the ball over his head, letting it roll down his back to the floor. No. 2 picks it up and passes it over his head and down his back. The ball must touch the floor between each player. Last man carry forward to front of line.

(c) Last man carrying ball forward hopping, leap frog fashion over the whole team to front of line.

(d) If group is large, use two balls for variety, starting second ball a few seconds after first. The players must run around to front. This method finishes when both balls have been returned to starting position at front of line.

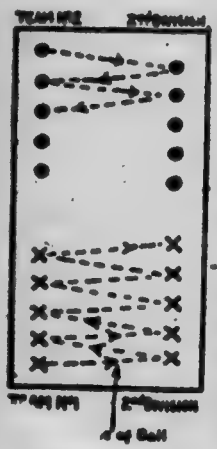
(e) Players in line, side by side, facing one way. Pass ball down the line over the outstretched arms to rear of line. Last player passes forward behind the line to starting point.

(f) Players in same position as No. 1. The ball is passed over the head and caught by No. 2, passing down the line this way, the last player running forward as above.

Medicine Ball Relay Combination

Divide the Square into teams of equal number. Use three medicine or basket balls or some substitute. Carry them all in the arms at the same time across running space and return to second player who picks up balls and continues to run.

Vary this by carrying the balls one under each arm and the third held between the knees. This furnishes considerable amusement.



Medicine Ball Bowling

Vary again by running in pairs, inside hands clasped and carrying the three balls any way they may devise as long as they keep hands clasped.

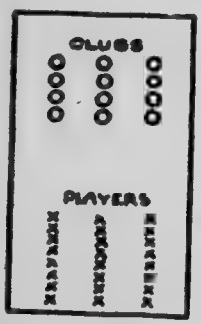
Medicine Ball Bowling

Divide the boys into two teams. Divide the teams into two sections, half at each end of the playing space, not over 60 feet apart.

At a given signal, No. 1 in each team bowls the medicine ball with as much speed as possible across the floor to No. 1 of the other half of his team. When the ball reaches him or ceases to roll, at which point he may rush out and get the ball returning to his line before bowling it back, he bowls it to the second player in his line. The bowling continues back and forth until the last player in the second division receives the ball. He picks up the ball, the entire line he is in links hands, and run forward to the first division, where the ball was started, thus finishing their game.

Indian Club Relay

Divide the square into teams. Place four or five Indian Clubs a short distance apart in front and in line with each team across the playing space. At a given signal, No. 1 of each team runs down past the clubs in front of his team; knocking the clubs down as he passes. He continues his running on to the end of the playing space. On the return he sets the clubs up again and touches off No. 2 who continues.



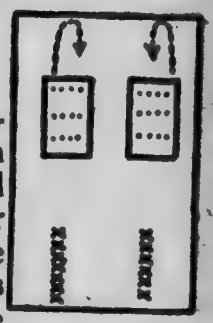
INDIAN CLUB RELAY

A variation of the Indian Club relay requires the same formation. The runners, instead of knocking down indian clubs, roll a medicine ball with one or both hands, in and out around the clubs, in figure eight style, back to start. If a club is upset stop and replace.

Forward Roll Relay

Place a mat in centre of floor in front of each team. Players run to mat, forward roll on mat,

run to the end of the room returning make another forward roll and run back to team, touching off No. 2 who does the same. If a team can do a backward roll use it for variety, or alternate.



FORWARD ROLL RELAY

Dead Man Relay

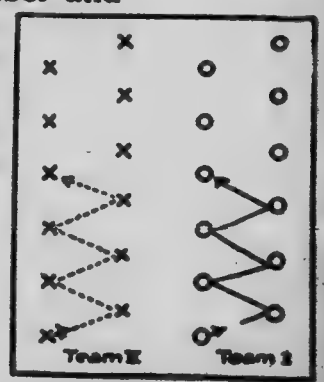
Place mats in front of each team, at the full extent of the playing space. The first player in each team goes to the mat, lies on his back with his head facing his team. At given signal the second player in each team runs forward, raises the player on the mat (who keeps his body stiff) by placing both hands under his neck. He then lies down in the same manner. The raised player runs back to line and touches off next player.

Zigzag Relay

The players are divided into two or more teams, each team sub-divided into two ranks. The two divisions of each team stand about five feet apart, facing each other, one line facing the space between two opposite players of his team. (see diagram) The first player in one rank of each group has a ball At a given signal, this is thrown to the third player in the opposite rank. This player throws it quickly to the second player of the first rank, and so on, zigzagging to the end of the line, where the ball is immediately returned in the same way. The group getting the ball back to the head first wins.

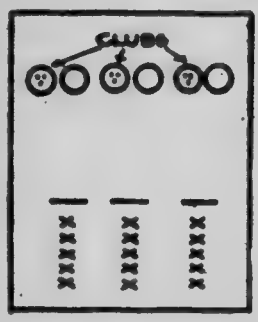
All-up Relay

Players divided into teams of equal number and line up at one end of the playing space behind the starting line. Directly in front of each team at the opposite end of playing space are drawn two circles three feet in diameter placed side by side. In one of the circles of each pair three Indian Clubs are placed.



ZIG-ZAG RELAY

On a given signal, number one of each team runs forward and with one hand only, transfers the clubs from one circle to the other. Each club must be standing and inside the circle before the player runs back to his team, touching No. 2, is who waiting ready to run. Each player runs in turn. The team wins whose last player makes the run first.



ALL UP RELAY

Newspaper Relay

The TUXIS Square is divided into teams of equal number. Each contestant is given two newspapers, or pieces of cardboard the size of a page of ordinary newspaper not over two feet square, one, one for each foot. He places one forward and steps on it with the right foot. He then picks up the other for his left foot and so on, each step taken only on the paper. The team finishing all its players first wins.

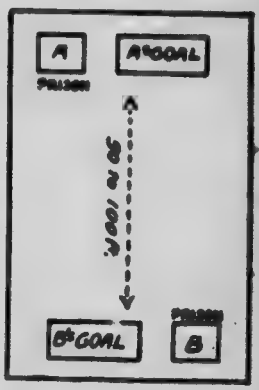
Group Games Requiring Larger Groups

Prisoner's Base

The group is divided into two equal teams, each selecting a captain. A large goal is marked off at each end of the ground or gymnasium with a small base or prison in one rear corner. The space between the goals is neutral territory or the playing space. The game starts by a player advancing from his own goal and "daring" the opposite team, who in turn sends out a player to tag the first player. Then the first side immediately sends out a second player to protect the darer by trying to tag his opponent. The first side then sends out a second player to cover their first man. Any player may tag a boy from the opposite side who left his goal before he did; but none who came out after he did. A player may return to his goal at any time, but the boy who went out

to cover him must return also. The captain directs the advancing and retiring of players.

Any player tagged is placed in the opponents' prison where he must remain until rescued by one from his own side. The prisoner may reach as far out of the prison as possible in order to facilitate means of escape so long as one foot is within it. (Note—If the playing space is large let the prisoners as they are caught take hold of hands thus reaching home as far as possible, the last prisoner caught standing with one foot in the prison. In such formation the first caught would be released first.)



PRISONERS BASE

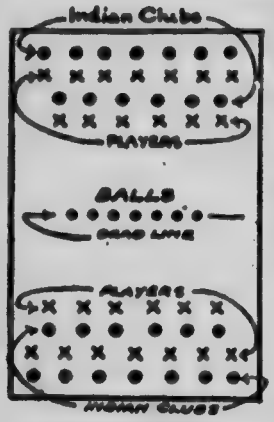
A guard should always be placed to intercept any attempt at rescue. A prisoner and his rescurer may not be tagged after he touches the prisoner. One rescurer may free only one prisoner at a time. The game is over when one side makes prisoners of all the opposing team.

A special score may be given for a player who may, by a wide detour, creep around unnoticed to the rear of the enemy's goal, passing around its goal and returning safely to his own base.

Bombardment

The ground is divided into two equal fields by a line drawn across the centre. At the rear of each section an indian club for each player is placed, the player standing in front of the club, as per diagram. The object of the game is to knock down the opponent's clubs, each player, therefore, serving as guard to protect his club and as a thrower. He may throw whenever he can secure a ball. The balls are placed at the beginning of the game in the centre of the field. None of the players of either team are allowed to pass over this centre line. The score is taken at a given time, the side knocking down the largest number of pins winning.

This game may also be played by using a straight elimination play, that is, as soon as the player's club is knocked down, he picks up his club, and leaves the floor, the game proceeding until either one of the teams is eliminated.



BOMBARDMENT

Another variation is to have each player go over to the opposite side when his club is knocked down until one side gets all of the opponent's players.

Catch and Pull Tug-of-War

A line is drawn down the middle of the playing space. The players are divided into two parties and stand, one party on either side of the line. The game starts on a signal and consists in catching hold of an opponent by any part of his body, as hand, arm, or foot, reaching over the line and so pulling him across the boundary. Any number of players may try to secure a hold on an opponent and any number may come to his rescue and try to resist his being pulled over the line, either by pulling him in the opposite direction or by trying to secure a hold on one of the opponents. A player does not belong to the enemy until his entire body has been pulled over the line. He must then join his captors in trying to secure players from across the line. The party wins which has the largest number of players at the end of time limit.

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Circle Race

The players stand in a circle a considerable distance apart and face around in single file in the same direction. At a signal all start to run, following the general outline of the circle, but each

trying to pass on the outside of the runner next in front of him, tagging as he passes. Any player passed in this way drops out of the race. The last player wins. At a signal from a leader or teacher, the circle faces about and runs in the opposite direction. As this reverses the relative position of runners who are gaining or losing ground, it is a feature that may be used by a judicious leader to add much merriment and zest to the game.

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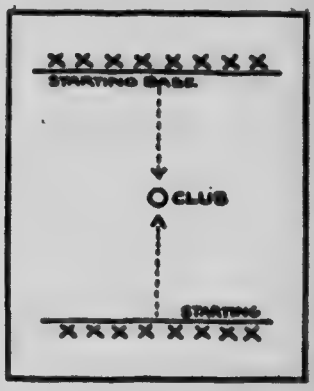
Club Snatch

A goal is marked off across each end of the playground. Mid-way between the goals an Indian club is placed; a handkerchief or other similar object may be used, placed on some support—on a stake driven into the ground, laid over a rock or stool, or hung on the end of a branch. A stone or dumb-bell laid on the ground may be substituted. In line with the club a starting base is marked on each goal line.



CLUB SNATCH

The players are divided into two equal parties, each having a captain. Each party takes its place in one of the goals. The object of the game is for one of the runners to snatch the club and return to his goal before a runner from the opposite goal tags him, leaving their starting bases at the same time on a signal. The players on each team run in turn, the captains naming who shall run each time.

The captains toss for first choice of runners; the one who wins, names his first runner, who steps to the running base, whereupon the competing captain names a runner to go out against him, trying to select one of equal or superior ability. Thereafter the

captains take turns as to who shall first designate a runner.

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Hip

Boys stand in an informal group. One of them is provided with a stick about the size of a broomstick and about two feet long. He throws this as far as he can, at the same time calling the name of one of the other players. The one who threw the stick, and all the others except the one whose name is called, then scatter in a run. The one who is called must pick up the stick, whereupon he becomes "Hip" and must chase the other players. Any player whom he catches he touches with the stick (pounding not allowed) and that player at once joins him in trying to catch the others. Anyone caught by the second player, however, must be held by him until Hip can come and touch the prisoner with the stick, whereupon he also joins Hip's party. As the number of players with Hip increases, there may be some pretty lively "tussling" on the part of players who are caught, pending the arrival of Hip to touch them with the stick, as he may have several to reach in this way, and the interval may be considerable in which the captor must hold his victim. The game ends when all of the players have been touched by Hip.

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Hound and Rabbit

A considerable number of the players stand in groups of three, with their hands on each other's shoulders, each group making a small circle which represents a hollow tree. In each tree is stationed a player who takes the part of rabbit. There should

be one more rabbit than the number of trees. One player is also chosen for hound.

The hound chases the odd rabbit, who may take refuge in any tree, always running in and out under the arms of the players forming the tree. But no two rabbits may lodge in the same tree, so as soon as a hunted rabbit enters a tree, the rabbit already there must run for another shelter. Whenever the hound catches a rabbit, they change places, the hound becoming rabbit and the rabbit hound. Or the hound may at any time become a rabbit by finding shelter in an empty tree, whereupon the odd rabbit who is left without shelter must take the part of the hound.

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Shoe the Horse

Entire group sit down and remove their shoes taking out the laces and placing in the toes of each shoe. Place the shoes all together in a pile, then retire a certain distance from them. At a given signal all the players rush to the pile, secure their own shoes, put them on, lacing properly, and run to a given spot. The first player arriving with his shoes properly laced wins.

This furnishes considerable amusement in the grand scramble for shoes.

Slap Jack

The players stand in a circle, clasping hands. One player runs around the outside of the circle and tags another as he runs. The player tagged immediately leaves his place and runs in the opposite direction. The object of both runners is to get back first to the vacant place. Whoever succeeds wins, and remains in that

place, the one left out becoming runner the next time.

This is sometimes varied by having the players bow and shake hands as they meet. This adds an element of self-control, but detracts from the vigor and sport of the game.

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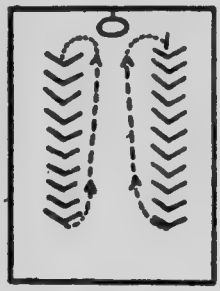


ARCH GOAL BALL

Arch Goal Ball

Basket ball and basket required. The boys divide into two groups, line up in single file facing the same basket. At a given signal each leader passes the ball backward overhead, it being caught by the player immediately behind and passed to the end of the line in the same way. The last player receiving the ball runs forward and tries to score a basket. He is allowed but one throw, when he takes his place at the front of his line and at once passes the ball backward overhead. Each basket made scores three points for his team. This continues until all players have thrown. The team wins which has the highest score.

Vary this game by playing against time. Each player throws until he succeeds in making a basket. The teams win whose last boy finishes first.

Circle Stride Ball

The boys all but one form a circle, standing in a stride position, with feet touching those of the next boy making a barricade for the ball.

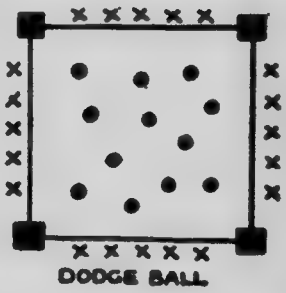
The odd boy stands in the centre and tries to throw the ball outside of the circle between the feet of the players. Those in the circle try to prevent the passage of the ball using only their hands for this. The play continues until the boy in the centre succeeds in sending the ball through the circle, when

he changes place with the boy between whose feet the ball passes.

The players must not move their feet, but in returning the ball to the centre boy, it may be thrown at different parts of the circle, taking other players off their guard, thus aiding the centre player.

Dodge Ball

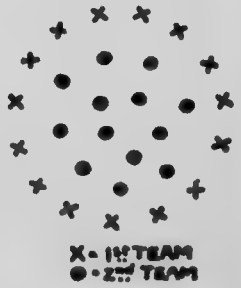
The Square is divided into two equal groups; one group forming a large circle or square marked off by standards, rocks or other articles that could be indicated as a corner. One group forms the circle or square according to the playing space. The other group stands within the circle scattered in any position. The outer group try to hit the centre group with a basket ball. The centre boys dodging to evade this. They may run, jump, dodge, or use any other method to evade the ball, but must not leave the ground and the circle.



The game may be played in three ways:

First, play until only one player remains in the circle. He is considered the winner and the groups change places.

Second, play until all the centre boys have been hit with the ball keeping track of the number of minutes required to accomplish this, the groups then changing. The



group which knock their opponents out of the circle in the shortest time wins.

Third, as soon as a player is hit he joins the outer circle and assists in hitting the centre players.

A player in the outer team must not throw from inside the circle. If he finds it necessary to enter the circle to recover the ball, he must either return with it to the outer circle before throwing or pass it to one of his own team in the outer circle.

Mount Ball

This is a game of ball played by half of the players while mounted on the backs of other players. It is therefore desirable that the players be paired off so that the two in each pair should be of nearly equal weight and size.

The players form a circle in pairs. To do this they line up two abreast, each with his selected partner. This double line then marches in circle, halts and faces inward. This will form two concentric circles. There should be considerable space between couples, in other words, the circle should be rather large in comparison with the number of players. It is then decided by a toss-up or otherwise which of the two circles shall first be "ponies" and which shall be riders. The ponies bend forward from the hips, pressing their hands against the knees, or thighs just above the knees. The knees should be stiff, not bent. The backs are thus bent forward and the riders mount, straddling the shoulders of the players who are ponies.

The ball is put in play by being tossed from any player to another and the game consists on the part of the riders in trying to keep the ball in as active play as possible in a simple game of toss and catch, and on the part of the ponies in trying to prevent the catching of the ball. To do this

Mount Ball

the ponies must grow restive and turn around in any way they see fit, but must not lose their general places in the circle.

When a rider fails to catch a ball, all of the riders must at once dismount and run in any direction, the pony belonging to the rider who missed the ball picks up the ball immediately, and as soon as he has it calls "Halt." All of the riders must then stand still, and the player who holds the ball tries to hit his recent rider. The rider aimed at may try to evade the ball by stooping or jumping, but must not otherwise leave his place on the floor. During this part of the play the other ponies remain in their position in the circle, so that the one who is throwing the ball will not confuse them with the riders. If the player (pony) who throws the ball at his dismounted rider succeeds in hitting him, all of the ponies and riders exchange places, the riders becoming ponies and the former ponies mounting them. If the player aiming the ball at his dismounted rider does not succeed in hitting him, the riders remount and the game goes on as before.

It is not permissible for a rider to hold a ball at any time, no matter how difficult his position at the moment may be; he must toss it at once. It is well to have a leader, whether one of the players or not, who watches for mistakes, gives the commands to mount and dismount and announces misses and hits.

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Rugby Basket Ball

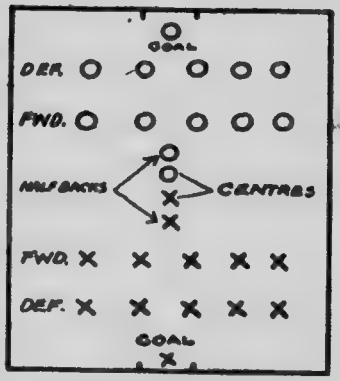
This game allows for all the freedom of running in football and the passing of basket ball. The boys are divided into two equal teams, from ten to twenty on a team, according to playing space.

A rugby ball is preferable, although a basket ball would do; upright goal posts such as jumping standards for goals are placed six feet apart. The players take positions as follows; a goal keeper, a centre and half back; the balance of the teams divide equally forwards and defence.

The game commences by the centre player passing the ball between his legs to the half back, who either runs with the ball or passes it to some of his team, advancing where possible towards his opponents goal by either passing, batting, kicking or carrying the ball.

The opposing team interrupts the progress of the ball in every way possible, and when the ball is in their possession, they advance.

To prevent undue roughness in an indoor game, a player can be tackled by only one opponent at a time. As soon as he is tackled (not with the idea of throwing, but simply to stop progress of ball) he must pass the ball. If for any reason this play develops into a held ball position, it is considered as a down, and the ball is put into play again at the spot where the play stopped. The player in possession of the ball claiming it for his team. The ball is put in play this way in a similar manner to the starting of the game, all the players being on side; *i.e.*, behind the play.



RUGBY BASKET-BALL

A goal is scored (counting one point) when the ball passes through between the goal posts. If the ball gets behind the goal, it is a goal kick. The goal keeper puts

it in play, either with a kick or a pass to some of his team.

This game allows a much larger number of players to participate than basket ball. It is a good game for beginners, teaching them the value of team play and developing their passing ability. It allows for greater individual initiative than basket ball.

It could develop into a very rough game if the referee is not very strict in insisting on a quick pass on being checked and a down, on held ball.

Spud

This is a combination of Call Ball and Ball Tag, with scoring and penalties added. It is very popular with boys of almost any age. The players stand in a group, with one in the centre holding the ball. The centre player drops the ball, at the same time calling the name of one of the other players. All but the one called immediately scatter, as they are liable to be tagged with the ball. The player called secures the ball as quickly as possible and tries to hit one of the other players with it. He may not run to do this, but must stand where he secured the ball. If he misses, he secures the ball, stands where he gets it, and tries again, the other players fleeing from him as before. If he hits a player, that one immediately secures the ball, tries to hit someone else with it, the second one hit tries to hit a third, and so on.

Whenever a player misses hitting another with the ball, it is called a "spud," and counts against him. When any player has three spuds against him, he must stand 20 ft. from the other players, with his back to them, and they each have one shot at him with the ball. The victim then starts the play again from the center of the ground.

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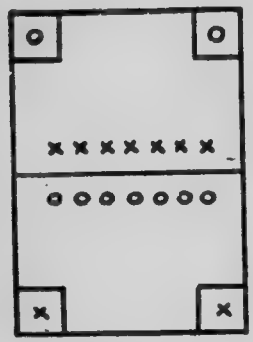
Corner Ball

Ground—The ground is marked off into a space measuring at least twenty-five feet by thirty feet. This is divided across the center by a straight line. In the further corners of each half so made, a small square goal is marked out, there being two such goals in each court.



CORNER BALL

Players—The players are divided into two even parties each of which takes position on one side of the ground and stations a goal man in each of the goals at the rear of the opposite side.

Object—The object of the game is to throw the ball over the heads of the opposing party to one's own goal men, who are at the rear of the opponents' court.

Rules and Points of Play—The players on each side are not bound to any special territory within their own court, but will naturally see that each of the goals at their rear is well protected and will try to intercept the ball before it can reach these goals. They will also, of course, try to throw the ball over the opposing party to their own goal men in the opposite court. No player may cross the line which divides the two halves of the ground. The goal men may not step outside of their goals. Any ball caught in this way fails to score. No opponent may step inside of a goal. When a goal man catches a ball, he must at once throw it back, trying, of course, to get it to his own party over the heads of the opponents who try to intercept it.

Score—Every ball caught by a goal man scores one for the party throwing. The side first scoring twenty points wins the game.

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Curtain Ball

No outside boundaries are necessary for this game. The ground should be divided into two approximately equal parts by an opaque curtain eight feet in height, strung on a rope or wire carried across from side supports. This should touch the ground, so that there is no means of seeing the position of the opposing players on the other side. The game may be played across a high fence or hedge instead of over a curtain.

The players are divided into two parties of equal number. There is no regular formation or disposition of the players over the ground. Each party should select an umpire, whose duty it is to stand at one end of the curtain on the opponents' side, where he can watch the opponents and keep score.

The ball is thrown back and forth from one side to the other over the curtain and should be caught before it can reach the floor. Players will try to deceive their opponents as to the point where the ball is to cross the curtain, and the more rapid the play is the more alert the players will have to be. The great sport of the game consists in the unexpectedness with which the ball may appear at any given point.

Opponents score one point whenever the ball touches the ground. The side wins which first scores twenty-one points.

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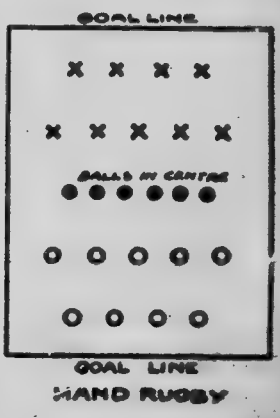

Hand Rugby

Divide the Square into two squads. Place facing each other on opposite sides of playing space. Divide each team into forwards and guards. Place several medicine

balls across the centre parallel to the two forward lines.

The object of the game is for the opposing team to push as many balls as possible behind their opponents' boundary line. Each ball pushed across counts one point and must be left there until the end of the game. The balls must not be raised off the floor and must be put in play where raised, one boy having his hand on the ball. As many as desire may concentrate on one ball.

HAND WRESTLE

Challenge Games

Divide into teams of equal numbers of boys (not over ten or twelve on each team). If you have more than two teams or squares represented, have semi-finals and finals in each event.

Hand Wrestle

Number one from the two opposing squares will take their positions in the centre of the floor. Each boy advances his right foot, placing it against the inside of his opponent's foot. The feet to be parallel. The left arms are placed behind the back. The right hands clasp in a firm grip. At a given signal the contest commences. Each boy tries to cause his opponent to move either his front or rear foot by losing his balance. This constitutes a fall. The best two out of three declares a winner. The winners then challenge the next player in line on the opposing team and soon down until all the players on each team have been thrown. The team having players still unthrown wins.

TWO-HAND WRESTLE

Two-Hand Wrestle

The same organization as above. The players stand about three feet apart with feet together, body straight, arms

above head and forward to touch opponent's hands. Clasp hands, fingers interlocked as per diagram. At a given signal each boy tries to throw his opponent by forcing his arms down, or bringing him to his knees. This may have to be decided upon occasionally by points, as two equally strong boys may not be able to proceed to a direct throw. After say, two minutes, the referee should be able to declare the player having the greater advantages in case a throw has not developed. The defeated player drops out. His place is taken by another from his own team. This continues until all of one team have been thrown. The team wins which has the last boy standing.

Hand Slap Wrestle

Hand Slap Wrestle

Same formation as above. Players stand about two feet apart with each player's feet in a line, toe and heel touching. Left arm placed behind back. Right arm swinging free in front. The player, by striking, feinting, or evading tries to cause his opponent to lose his balance. This constituting a fall. The fallen player's place is taken by another player from his own team. This continues until all of one team have been thrown. The team wins which has the last boy standing.

Rooster Fight

Teams divide off as above. A circle about four feet in diameter is drawn between the two teams. Number one from each team enters the circle, raises his left leg behind the right leg, grasping the left ankle with the right hand. The left arm is placed behind the back and clasps the right arm at the elbow, the boy balanced on the right leg. The two opponents hop forward trying to bunt each other with their chest or shoulders,

ROOSTER FIGHT

with the idea of pushing him out of the circle. This constitutes a win for the successful rooster. The defeated rooster's place is taken by another boy in his own team. This continues until all of one team have been thrown. The team wins which has the last boy undefeated. The game can be made very interesting if the players dodge and try to secure a throw by evading as well as charging opponent.

Leaning Broad Jump

Players divide into teams of equal number. Number one player will start in each team at a given chalk mark on the floor by placing left or right hand on this mark, the rest of the body is held in a straight line, weight supported on the feet extended and the one hand on the line. In the free hand, each boy has a piece of crayon. He reaches forward as far as possible without falling and places a mark on the floor. The second player starts where the first marked and makes his mark as far as possible. After the entire team have had a turn, the team which has covered the most space in their marking wins.

Indian Leg Wrestle

Have two teams of even number of players. First players of each team take their position lying flat on the back, side by side, facing in opposite directions. They then lock arms and as the judge counts, one, two, three, they raise the leg next to the opponent so as to be ready when the official says three to lock legs. Each tries to turn the other over backwards. The one who succeeds in doing this wins. The best two out of three declares the winner. Then the next opponent in line takes his position against the winner and so on through the team, the team having one or more competitors not thrown winning.

Harlequin Wrestle

Each contestant stands on one leg, one leg and arm swinging free. They grasp right hands and each tries to make the other lower his upraised foot to the ground, or touch the floor with his free hand. Losing balance or touching floor with free hand or foot constitutes a fall. A fall may be produced only with the engaged hand.

La Savate

Two contestants fold arms, hop on one foot until each is within touching distance with their free feet, then by feinting or tapping with the free foot cause the opponent to lose his balance and touch floor with free foot. (From the French boxing contests where the feet are used.)

Knee and Toe Wrestle

Two players or two entire teams may face each other sitting on the floor. The knees should be drawn up closely and the players should be near enough together to have the toes of each touch those of the opponent. Each player passes a stick or wand under his knees and his arms under it and clasps hands in front of his own knees. The player getting his toes under those of his opponent and tipping him over constitutes a fall. Begin on starting signal.

KNEE & TOE WRESTLE

Dog Collar Tug-of-War

Two players face each other about three feet apart on hands and knees. A knotted towel or rope is placed between rope and neck to prevent chafing. The heads should be held high to prevent rope from slipping off. At a given signal, the players pull against each other trying to pull the opponent from the mat or to pull the collar from around his neck. (The rope or towel is put over the head of both players and resting on the back of the neck, the

rope being long enough to encircle both with the head bent well back to prevent the rope from slipping over the head.)

Strong Arm

Place the contestant in prone position. The weight of the body supported on the feet and one straight arm, right or left, the other arm must be kept behind the back.

Spread the thumb or fore-finger of the supporting arm and in the space put a pin or some sort of small object that could be caught with the teeth.

The object of the test is to bend forward with the head, grasp the pin in the teeth and return to starting position without losing the balance or removing other arm from behind the back. It requires considerable strength to accomplish this feat.

Forearm Test

Two contestants face each other across a small table or at one corner of a large one. Each place the elbow of the right arm on the table and lock the hands. The hands and arms must be parallel and also perpendicular at the start. No other part of the body must touch the table. The other arm must be behind the back and at a given signal both contestants push, trying to put the opponent's arm on the table. Jerking or pulling is not allowed.

Quiet Games

These games are distinguished from games which contain vigorous running or chasing. They are not necessarily noiseless, but more of a mental form of exercise than physical.

Author's Initials

Each boy is given a piece of paper on which is written various series of groups of words each group

descriptive of some author and each word beginning with one of his initials in order.

The following are suggested, others may be devised:

1. Juveniles firmly conquered (James Fenimore Cooper).
2. Name honored (Nathaniel Hawthorne).
3. Bright Humor (Bret Harte).
4. One wholesome humorist (Oliver Wendell Holmes).
5. Really lasting stories (Robert Louis Stevenson).
6. Cheerful laborer (Charles Lamb).
7. Tender, brilliant author (Thomas Bailey Aldrich).
8. Heroism wisely lauded (Henry Wadsworth Longfellow).
9. Just, gentle writer (John Greenleaf Whittier).
10. Poetry bridged skyward (Percy Bysche Shelley).
11. Clever delineator (Charles Dickens).
12. Rare brain (Robert Browning).
13. Weird imagination (Washington Irving).

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Acting Proverbs

Players divide themselves into two groups, actors and audience. Reverse each group in turn taking the place of the other group, the total number of correct guesses by each group deciding the winner.

Each one of the actors picks out a proverb, which he will act in turn before the audience as, for example,

"A bad workman quarrels with his tools." He will go into the room carrying some carpenter's tools, take off coat, roll up sleeves and start working on some piece of furniture all the time grumbling and complaining about his tools.

Other proverbs such as "Spare the rod and spoil the child" could be acted by two boys.

Spelling Game

The boys divided into two equal teams, sitting facing each other. Each boy is given three chances, after losing the third chance he leaves his team. The game commences by No. 1 of either team mentioning a letter. The boy directly opposite must add another letter to it, if possible keeping the word unfinished as long as possible. The boys add letter alternating from one team to the other. The player who is forced to give the letter that completes the word loses one chance. The play continues from there down the line by the next player starting a new word.

Every letter added must be part of a word and not an odd letter thought of on the spur of the moment. When there is any doubt as to the letter used by the last player being correct, he may be challenged by any of his opponents and will then have to give the word he was thinking of when adding the letter. If he cannot name the word, he loses a chance, but if he can the challenger loses a chance.

There are three ways of losing a chance:

1. The player may give a letter and on being challenged be unable to give a word.
2. He may himself challenge another player who is not at fault.
3. He may be obliged to add the final letter to a word and so complete it.

A word might might start like this—"P"—the next player thinking of "Play" would add "l" the next player thinking of plough would add "o." The next player not thinking of either of the former words might add "v" thinking of plover.

Observation

This game is a test of visual memory. When played in a parlor, all the players are seated except one, who passes around a tray or a plate, on which are from six to twenty objects, all different. These may include such things as a key, spool of thread, pencil, cracker, piece of cake, ink bottle, napkin ring, small vase, etc. The more uniform the size and color of the object the more difficult will be the test. The player who carries the tray will pass at the pace of an ordinary walk around the circle, giving each player an opportunity to look at the objects only so long as they are passing before him. It is not allowable to look longer than this. The observer must then at once write down on a slip of paper the names of as many of the objects as he can remember. The player wins who writes correctly the longest list.

It is sometimes more convenient to have the articles on a table and the players all pass in a line before them.

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Literary Lore

Each player is given a sheet of paper on which the following questions are written. The player wins who writes correct answers to the largest number of questions. This game may be worked up from the writings of any poet or author. Examples are given from Tennyson and Longfellow. The answers are appended here, but in playing the games should be read by the host or hostess at the end.

TENNYSON

1. What poem is it that sings down the vale?—The Brook.
2. What is the poem whose father is king?—The Princess.
3. The poem that honors a friend who is gone?—In Memoriam.
4. The poem that rules in the spring?—The May Queen.
5. The poem that lives in the depths of the sea?—The Mermaid.
6. The poem once baked in a pie?—The Blackbird.
7. The poem from which all its dwellers have gone?—The Deserted House.
8. The poem that is good-bye?—The Farewell.
9. The poem whose dress was tatters and rags?—The Beggar Maid.
10. The poem that lets in light?—The Window.
11. The poem in which we see castles in Spain?—The Day Dream.
12. The poem that sees in the night?—The Owl.

LONGFELLOW

1. What poem is it that helps to shoe your horse?—The Village Blacksmith.
2. The poem that needs an umbrella?—The Rainy Day. An April Day.
3. The poem that carries you across?—The Bridge.
4. The poem that finds you weary?—The Day is done.
5. The poem that keeps the time?—The Clock on the Stairs.
6. The poem that belongs to little people?—The Children's Hour.

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Progressive Poetry

Each guest or player is given a sheet of paper and told to write an original line of poetry, he folds over his line and tells his neighbor the last word of the previous line. The neighbor knowing only the last word of the previous lines, adds a second line to rhyme with the first. This is folded over and in turn passed on down the line, each player adding a line rhyming with the words given him by the previous writer. The finished work is read in turn by each player for the entertainment of the group.

Recognition

Each boy is given a card or slip prepared with the following questions, or the list may be dictated at the time. What famous persons, historical or mythical, do these objects suggest?

1. Hatchet? (George Washington.)
2. A Rail Fence? (Abraham Lincoln.)
3. A Kite? (Benjamin Franklin.)
4. A muddy cloak? (Sir Walter Raleigh.)
5. A lonely Island? (Robinson Crusoe.)
6. A burning bush? (Moses.)
7. A ruff? (Queen Elizabeth.)
8. A glass slipper? (Cinderella.)
9. An apple? (William Tell.)
10. A silver lamp? (Alladin.)
11. A smooth round stone? (David.)
12. Long hair? (Sampson.)
13. A dove? (Noah.)
14. A pomegranate seed? (Persephone.)
15. A spider web? (Robert Bruce.)
16. A key? (Bluebeard.)
17. A wolf? (Red Riding Hood.)
18. A steamboat? (Robert Fulton.)

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HONOR BADGES AND ATHLETICS

HONOR BADGES AND ATHLETICS

CHAPTER

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CHAPTER XVIII
HONOR BADGES FOR TUXIS BOYS

Honor Badges

A SERIES of Honor Badges has been provided to be awarded to TUXIS BOYS who qualify in a special way in various features of the Program. The requirements for each Badge call for participation in the corresponding section of the Program except in the case of Badges which have no direct relation to the Program. In most cases additional tests are required before an Honor Badge is awarded. The requirements are set forth herewith.

The exact size and design of each badge is shown in the following pages beside the requirements. They are made of silk and can be attached to the TUXIS BOYS' sweater crest. They are of three degrees: Red Honor Badge, the first or highest class; Blue Honor Badge, the second or middle class; White Honor Badge, the third or lowest class. They are shown printed in color in all three degrees facing page —.

The winning of an Honor Badge in any subject does not entitle the TUXIS BOY to Charting Honors in the same subject unless the requirements for Charting Honors are included in those stated for Honor Badges.

The conditions as stated under each heading must be completely carried out. The Mentor must certify that this has been done when applying for the Badges. These awards will be supplied only to Mentors who have registered with their Sunday School Headquarters or with the C.S.E.T. Committee, 120 Bay St., Toronto.

Agriculture

AGRICULTURE

A. (1) Keep records of growth of grain.
(2) Work out the cost of producing three products of the farm.
(3) Keep satisfactory milk records.
(4) Write articles for farm papers, covering phases of farming.

B. Plough, harrow, seed, weed down, harvest land.

C. (1) Follow instructions of Canadian Seed Growers' Association in producing registered seed.
(2) Make germination test of all seed used on a farm for a year, (previous to seeding).
(3) Treat seed for smut.

D. Ability to judge live stock, grain, fruit, etc.

E. Knowledge of soils, rotation of crops, use and care of farm machinery, etc.

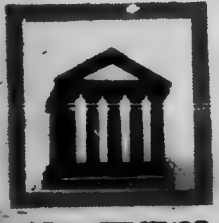
	"A"	"B"	"C"	"D"	"E"
Red.....	Any three	10 acres	First two	Test	Test
Blue.....	Any two	5 "	Any two	Tert	...
White.....	Any one	2 "	(1)	...	...

AQUATICS

Aquatics

For requirements for Honor Badge see page 55.

Architecture



ARCHITECTURE

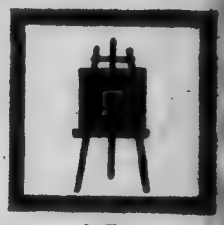
A. Produce a photograph, sketch or picture, illustrating the various orders of architecture.

B. Make a satisfactory drawing illustrating one order of architecture.

C. Tell of the history of architecture, giving the important periods.

D. Make an original drawing, in ink, suitable for making blue prints, of an eight-roomed house. Give specifications and cost of materials.

The Local Board of Judges will decide as to whether Red, Blue or White Honors should be awarded. A, B, C and D required.



Art

A. Identify and describe five famous pictures or their reproduction and give a short sketch of the lives of the artists.

B. Make a pencil sketch of a flower.

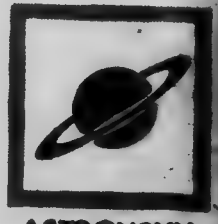
C. Make a pencil sketch of an animal.

D. Paint an original outdoor scene.

The Local Board of Judges will decided as to whether Red, Blue or White Honors should be awarded. A, B, C and D required.

Astronomy

For requirements for Honor Badges, see page 31.



Aviation

A. Make a box kite that will fly.

B. Make a model flying machine that will fly at least twenty-five yards.

C. Describe the various types of flying machines.

D. Describe the various types of engines.

E. Give the names and achievements of twelve famous air-men.

Red	Qualify under		A, B, C, D and E
Blue	"	"	A, C, D and E
White	"	"	A and E

Birds

For requirements for Honor Badge, see Page 30.

Camping

Fulfill the following requirements:

A. (1) Put up a tent and trench it properly.

(2) Make a comfortable bed of wildwood material.

(3) Demonstrate how to pitch a tent on a rocky, and on a sandy soil.

CAMPING

(4) Build a latrine (toilet).

(5) Build an incinerator for burning garbage.

B. (1) Build a fire-place.

(2) Prepare with wildwood material and light ten fires in succession with ten matches.

(3) Boil one quart of water in a small pail in twelve minutes with one log, one match and an axe.

(4) Make two good devices for holding pails, pots and a frying pan over a fire.

(5) Make good soup, pancakes and a dessert. Cook fish and vegetables.

C. (1) Make a serviceable camp stool.

(2) Make a willowbed or a grass mattress.

(3) Make a sun dial.

(4) Make a pair of tilting spears and tilting tubs.

(5) Make any useful or ornamental article for camp.

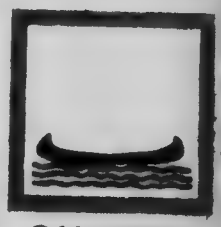
(6) Paint totem on a slab of wood about four inches wide by seven inches long to represent your woodcraft activities.

D. (1) Pass the TUXIS BOYS' Life Saving Test.

(2) Pass the TUXIS BOYS' First Aid to the Injured Test.

	"A"	"B"	"C"	"D"
Red.....	Pass 5 tests	6 tests	5 tests	2 tests
Blue.....	" 4 "	5 "	4 "	1 "
White....	" 3 "	4 "	3 "	1 "

Canoeing



CANOEING

A. Swim.

B. Swim with clothes and shoes on.

C. Paddle a canoe alone on still water one mile.

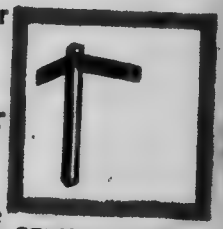
D. Know how to beach, cache, portage, repair a canoe, know proper paddling stroke and posture and make a continuous canoe trip.

E. Tip a canoe in water over your depth. Climb in without help and bale out alone.

	"A"	"B"	"C"	"D"	"E"
Red.....	150 yds.	60 yds.	in 11 min.	250 miles	Test
Blue.....	150 "	45 "	in 13 "	125 "	"
White.....	150 "	15 "	in 15 "	50 "	..

Century Hiker

Red.....Three "Centuries" in one year
Blue.....Two " " "
White.....One " " "



CENTURY HIKER

Demonstrate proper clothing and care of feet for hike.

Century Hikers' Club

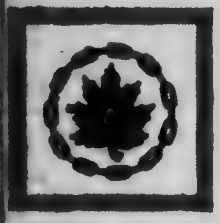
Any TUXIS BOY may become a member on remitting the registration fee of 50 cents to "Taylor Statten, National Boys' Work Secretary, National Council of the Y. M. C. A., 120 Bay Street, Toronto.

A registration number is given, an account opened, and distances are recorded as received by the Recording Secretary.

The Century Hikers' Club Bar will be mailed to every registered hiker who walks 100 miles within six months on hikes or outings into the country.

Use the official blanks for making records. They will be issued on receipt of registration fee. Not less than five miles per day will be recorded, and at least two persons must take part in the hike.

Citizenship



A. Active participation in such community welfare movements as:
   (1) Playground Movement.
   (2) Big Brother Movement.
   (3) Anti-Tuberculosis Campaign (by selling Christmas Seals).
   (4) Learn to Swim Campaign.
   (5) Safety First.
   (6) Baby Welfare, etc.

B. (1) Attend session of Municipal Council, or Provincial Parliament, or Dominion Parliament.
   (2) Be a councillor in a TUXIS BOYS' Community Council.

C. Take part in a
   (1) Clean-up Campaign, beautifying front or back yard.
   (2) Boy Life Survey.
   (3) Promote or take part in a "Three C's Campaign."
   (4) Promote or take part in a "Find Yourself Campaign."

D. (1) Know and state the public and private institutions which stand for community uplift.
   (2) Know and state gist of laws affecting boy life in the community.

E. Cultivate and demonstrate the "Second Mile" spirit in connection with your TUXIS Square.

	"A"	"B"	"C"	"D"	"E"
Red...	Test in any one	Both	(3) And any other two	Both	Test
Blue...	" " "	Either	(3) And any other	Either	"
White.	" " "	(1)	Any one	(1)	"

Entertainer

A. Do such a "stunt" before a group of at least five persons as recite well a standard classical or humorous selection, play an instrumental solo, sing a solo, do acceptably a parlor trick of magic or of impersonation, act acceptably a moving picture (silently) of such a subject as "Red Riding Hood," "A City Boy on the Farm the First Time," etc. (Pantomime).

ENTERTAINER

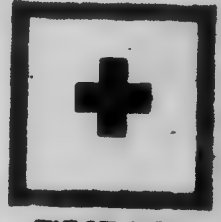
B. Participate with others publicly in:
(1) An Historical Pageant.
(2) Amateur Dramatics.
(3) Mock Trial.
(4) Folk Dancing.
(5) Glee Club Concert or Minstrel Show.
(6) Indian Play in Rythmic Pantomime.

C. Know the value of the art of Story-telling, the fundamental principles of this art, and entertain a group of not less than five persons by telling well a good story.

D. Promote organize and conduct successfully for a group of not less than five persons, a party, sleigh-ride, TUXIS Square social evening, club reception or similar function.

E. Represent his TUXIS Square at a Community Conclave in games, stunts, or in other ways contributing to the Entertainment of the Conclave.

	"A"	"B"	"C"	"D"	"E"
Red.....	Five times during season	Any one	Ten times during season	Once during season	Once at least
Blue.....	Three	"	Five times	once	..
White....	Twice	"	Three times	..	..



FIRST AID

First Aid

For requirements for Honor Badges see Page 83.

Folk Dancing

FOLK DANCING

A. (1) Dance the standard Scottish Dances, such as the Highland Fling, the Sword Dance and Scottish Reel.

(2) Dance the standard Irish Dances, such as the Lilt, Jig, Irish Reel, Irish Hornpipe, Clog and Shuffle.

B. (1) A Greek Dance.
(2) A Spanish Dance.
(3) A Hungarian Dance.
(4) An Italian Dance.
(5) A Dutch Dance.

C. (1) An Indian Dance.
(2) The Negro Cake-walk or Buck and Wing.

HEALTH & ENDURANCE

	"A"	"B"	"C"
Red	3 in either (1) or (2)	Any 3 dances	Any 3 dances
Blue	2 in either (1) or (2)	Any 2 dances	Any 2 dances
White	1 in either (1) or (2)	Any 1 dance	Any 1 dance

Health and Endurance

For requirements for Honor Badges, see Page 48.

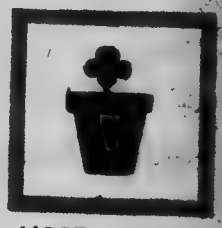
Hobbies

HOBBIES

This Honor Badge will be awarded to TUXIS BOYS who in the estimation of the Local Board of Judges qualify in any hobbies of a worth-while nature that are not included in the requirements for other Badges. For instance, Basket-making, Wood-carving, Clay-modelling, Leather-working, pierced Brass or Metal Work, Wireless Telegraphy, Collections of various kinds.

The Mentor or Local Board of Judges in awarding the Red, Blue and White Honor Badges should give full consideration to the educational value of the hobby.

Horticulture



A. Distinguish and name garden flowers or ornamental trees.

B. (1) Plant and care for a vegetable plot with a crop worth at least $5.00.

(2) Plant and care for a border of annual or perennial flowers of at least ten different kinds.

(3) Tell how plants are propagated by: seed, roots, cuttings, tubers, birds, grafts and propagate one of each.

(4) Plant shrubs, trees, climbers or vines that will tend to improve the appearance of your home.

(5) Make a lawn from seed.

C. (1) Make a hot bed or cold frame successfully.

(2) Operate a hot bed or cold frame successfully from the time of sowing of vegetable or flower seed until time of transplanting.

D. Look after:

(1) Fruit trees,

(2) Small fruit bushes, including the pruning, spraying, cultivating, picking, grading and marketing of the fruit.

E. Send a bouquet of flowers a week to hospital or "shut in" from your own garden.

	"A"	"B"	"C"	"D"	"E
Red.....	25	Any 3	both	Either	For 3 months
Blue.....	20	" 2	(2)	"	For 2 months
White.....	15	" 1	Either	...	For 1 month

Indian Life

A. Name Indian tribes that inhabited Canada. Give their present location.

B. Tell Indian Legends.

C. Sing Indian Songs in the Indian Language.

JUMPING

D. Dance Indian Dances.
E. Make an Indian tepee or an Indian totem pole.

	"A"	"B"	"C"	"D"	"E"
Red.....	20	10	3	6	1
Blue.....	15	6	2	4	..
White.....	10	4	1	2	..

Jumping

For requirements for Honor Badges, see Page 58.

LIFE SAVING

Life Saving

For requirements for Honor Badges, see Page 56.

Marksmanship

MARKSMANSHIP

Qualify for the pins of merit awarded by the Dominion Marksmen, Junior Department. For free handbook on rifle-shooting and full information, write the Dominion Marksmen, Box 1200, Montreal, Que.

Red Honor Badge.....	Qualify for Gold Pin
Blue " "	" " Silver Pin
White " "	" " Bronze Pin

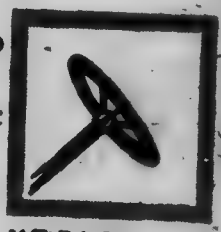
Mountain Climbing

A. Climb a mountain of at least five thousand feet.
B. Camp out in the mountains during one year.
C. Climb mountains of a certain height.
D. Pass an oral examination on the information contained in the article in this Manual on Canada's Mountain World.

	"A"	"B"	"C"	"D"
Red	5	3 weeks	13,000 ft.	90%
Blue	3	2 "	10,000 ft.	80%
White	1	1 "	7,000 ft.	70%

MOUNTAIN CLIMBING

Motor Mechanics


MOTOR MECHANICS

A. Operate and care for an automobile without help or instruction.

B. Remove, repair and replace for use, pneumatic tires.

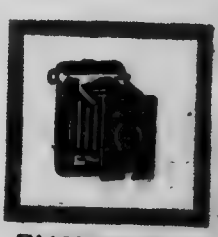
C. Know and state the principles of construction and operation of clutch, carburetor, magneto, spark plugs, valves, differential, transmission.

D. State method of extinguishing burning gas or oil.

E. Be able to pass official local examination for licence for motor driver.

	"A"	"B"	"C"	"D"	"E"
Red.....	500 miles	Test	All 7	Test	Test
Blue.....	300 "	"	Any 5	"	"
White.....	100 "	"	Any 3	"	"

Photography


PHOTOGRAPHY

For requirements for Honor Badge, see page 34.

Public Speaking

PUBLIC SPEAKING

For requirements for Honor Badge, see page 36.

Rowing

A. Demonstrate ability to row and steer a boat, and to bring alongside and make fast.

B. Row (single sculls) one mile.

C. (1) Tie and correctly name ten different knots.
(2) Use palm and needle.
(3) Fling a rope coil.
(4) Fling a life buoy.
(5) Box the compass.

D. Know and state the rules of the road and use of lights at night.

ROWING

E. Swim with clothes and shoes on.

RUNNING

	"A"	"B"	"C"	"D"	"E"
Red.....	Test	in 11 min.	All 5	Test	60 yds.
Blue.....	"	in 12 "	Any 3	"	45 "
White.....	"	in 18 "	(1)	"	15 "

Running

For requirements for Honor Badges, see Page 58.

Sailing

A. (1) Tie the following knots: Sheet-bend, carrick-bend, fisherman's, reef, bowline, bowline on a bight, sheepshank, rolling hitch, clove hitch, timber hitch, two half hitches and halter.

(2) Cover an eye splice and make a long and a short splice, and crown the ends of a rope.

(3) Demonstrate the use of palm and needle and show how to fling a life buoy and a coil of rope.

B. (1) Give the nautical names of the ropes, masts and various parts of a sail boat.

(2) Box the compass.

SAILING

C. (1) State the rules of the road.

(2) The bells and watches.

(3) The proper method of flying the flags.

(4) Describe the signal lights.

(5) Have a knowledge of weather wisdom and tides.

D. Handle the tiller on a sail boat for fifty miles, giving directions for sail adjustment. This need not be on one trip.

E. (1) Swim fifty yards with clothes and shoes on.

(2) Demonstrate ability to handle a row boat.

The Judges will award the Honor Badges on the basis of 90% for Red; 80% for Blue and 70% White, and require at least 50% in every section.

SKATING

Skating

	White	Blue	Red
100 yards.....	13 1/5 secs.	12 3/5 secs.	12 secs.
220 "	32 "	28 "	26 "
¼ mile.....	65 "	60 "	55 "
½ "	1 min. 55 sec.	1 min. 50 sec.	1 min. 45 sec.
1 "	3 min. 25 sec.	3 min. 10 sec.	3 min.

World's Records

220 yards.....	16 years of age		21 1/5 sec.
¼ mile.....	14 " "		46 1/5 "
½ "	16 " "		1 min. 30 3/5 secs.
1 "	16 " "		2 min. 48 secs.

SKIING

Skiing

A. Travel in one hour.
B. Travel in one day.
C. Cover in a jump.
D. Make jumps in proper form.
E. Cover during season.

	"A"	"B"	"C"	"D"	"E"
Red.....	7 miles	50 miles	40 feet	7 times	100 miles
Blue.....	6 "	35 "	30 "	5 "	70 "
White.....	5 "	20 "	20 "	3 "	50 "

SNOWSHOEING

Snowshoeing

A. Travel in one hour.
B. Travel in one day.
C. Travel in one season.

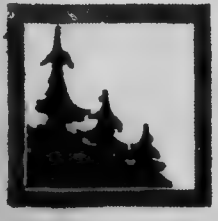
	"A"	"B"	"C"
Red....	7 miles	30 miles	100 miles
Blue...	6 "	25 "	75 "
White..	5 "	20 "	50 "

Team Games

For requirements for Honor Badges see page 51.

Throwing

For requirements for Honor Badges, see page 58.



Trees and Shrubs

For requirements for Honor Badges, see page 30.

Wild Flowers and Ferns

For requirements for Honor Badges, see page 31.

CHAPTER XIX

ATHLETIC RULES AND TABLES

Basis of Grading for Athletic Events

REALIZING the younger boy of above average was given an unfair handicap as well as the older boy who was under average weight was given an undue advantage under a basis of grading by weight only, quite an extended study has been made to ascertain, (1st) if a basis could be worked out to more nearly equalize the conditions mentioned above, and (2nd) provide a simple basis so that it would be easy to ascertain what class boys would be in.

The first study was on an age, height and weight basis which would be by far the more equal basis, but, as it presented complications which would make it harder to classify boys, it was discarded.

The next study dealing with age and weight proved more profitable and the following age and weight basis meets the above requirements.

A summary of study of average weight of 67,987 boys in the United States gives the following result for the various ages :

12 years.....69.8 lbs.	13 years..... 75.2 lbs.
14 years.....82.3 lbs.	15 years.....91.4 lbs.
16 years.....111.9 lbs.	

The above study as well as personal study of the weights of the boys' departments of a number of Ontario Y.M.C.A.'s shows that the average weight of a 12-year-old boy is 69.8, and that the boy of twelve over 80 lbs. is well above average. He had to compete under the old basis in a group largely older than himself where his extra weight was a handicap as well as having to compete with those who had had two to five years' extra training. One 12-year-old boy weighed 127 lbs. and under the old basis had to compete in the unlimited class. Under present basis, all boys under 13 years compete in Class 1 irrespective of weight.

The study reveals that there is but a very small increase in weight but enough to justify grouping boys under 14 years in Classes 1 and 2, according to weight, as most boys under 14 years are under 80 lbs. It is an exceptional 13-year-old boy that is over 95 lbs., and he, therefore, competes in Class 2, even if over 95 lbs. for reasons given under Class 1.

It is the unusual boy between 14 and 16 years who is under 80 lbs. and with the two to three years natural and special training, he is grouped in Class 2 as minimum class, and over 95 lbs. in Class 3 as the maximum, as the boy under 16 and over 110 lbs. is above average.

Grading for Athletics, Age and Weight Basis

Class 1. Boys *under 13 years* will all be grouped in Class 1 irrespective of weight.

Class 2. Boys *under 14 years* will be grouped by weight in Classes 1 and 2. (If under 81 lbs. Class 1; if 81 lbs. or over in Class 2.)

Class 3. Boys *14 years and under 16 years* will be grouped in Classes 2 and 3. (Under 96 lbs. in Class 2; 96 lbs. or over in Class 3.)

Class 4. Boys *16 years and under 18 years* will be grouped in Classes 3 and 4. (Under 111 lbs. in Class 3; 111 lbs. or over in Class 4.)

Class 5. Boys *18 years of age and over* will be grouped in Class 5 irrespective of weight.

Rules for the Conduct of Athletic Events

60-Yard Potato Race

For the Potato Race draw two circles, each two feet in diameter, on the floor, the centres being 28 feet apart. Place three potatoes, stones, or blocks of wood about the size of potatoes in one circle. The runner must carry these to the other circle. Except at the start and finish he must run around the circles at both ends without touching them and finish the race at the end from which he started.

Standing Broad Jump

A piece of wood eight inches wide is sunk level with the ground, or a line may be made on the ground where a board is not used. This is called the "take off." The toes must be just even with the edge. If the boy steps over the edge of the line, it is a foul and counts as one trial. The jump is measured by placing the free end of the tape at the line and measuring to the nearest mark made by any part of the boy. If a boy falls or steps backward, the distance measured is not where his feet first landed, but where he made a mark when he fell or slipped back. Every boy shall have three trials and the best shall be the one recorded.

Running High Jump

For this event, two uprights, two pins and a cross stick or bar, are required. The uprights may be made of two or three-inch sticks, six feet in length. Beginning two feet from the ground, holes are bored, one inch apart. The uprights should be placed on the ground, nine to twelve feet apart. The cross sticks or bars should be one inch square and ten to fourteen feet in length. A rope cannot be used for the cross stick. The bar rests on five-inch pins or wire nails (points sticking out), which project not more than three inches from the uprights. The ground where the boys will land is dug up and levelled.

The bar is placed at the lower limit of the weight class, and is raised one inch at a time. Each boy is allowed three jumps at each successive height, and takes his jump in turn. Those who fail in their second trial, take third in their proper order. When a boy fails on his third trial at any height, he is declared out of the test, and is given credit for the last height which he cleared.

Knocking down the bar is counted as a trial. Running under the bar is counted as a "balk." Three balks are counted as one trial. The boy may run any distance and from any direction before making his jump.

The height of each jump is measured by holding the free end of the tape so that it just touches the ground directly beneath the centre of the bar, and reading the height on the upper side of the bar or stick. Care should be taken to see that the ground is perfectly level and that the tape is vertical.

Standing Hop, Step and Jump

The rules are the same as the Standing Broad Jump, except that a hop, step and jump are made in rapid succession. The contestant shall stand

upon one foot; shall spring therefrom, alighting upon the same foot and then take a step and jump.

Throwing for Distance

This event may be conducted on the road or in a field. The starting line is made on the ground. Another line is made fifteen feet back of the starting line. In making his throw, the boy starts at the back line and runs to the starting line. If he goes over the starting line, it is a foul and counts as a trial.

Each boy is allowed three trials in turn, and the best throw is recorded. Only the regulation baseball that weighs 5 oz. and is 9 in. in circumference is used for the test. The measure is taken from the starting line to the nearest mark on the ground.

Throwing at a Target

Make a round target 4 feet in diameter, radius 2 ft. In the centre, draw a circle 1 ft. in diameter, radius 6 in., to be known as the "Bull's eye." Between the outer edge of the Bull's Eye and the outer edge of the target draw two circles each six inches apart. The space next to the Bull's Eye will be the "Inner," the next space the "Magpie," and the outer space the "Outer."

Place the target so that the lower edge of the "Outer" is three feet from the ground, or floor. Draw a line 50 feet from the target. The thrower shall stand behind this line when he throws the ball. Use a regulation size and weight baseball, 5 oz. in weight and 9 in. in circumference. Cover the ball with chalk or some powder that will leave a mark on the target when the ball hits it. Each contestant is allowed 10 throws. If the mark on the target indicates that the ball touched the edge of any circle, it shall be counted as having struck the space counting the lower score of the two.

Where this event is conducted indoors the regulation Playground or Indoor Baseball may be used.

Putting the Shot

The shot is a metal ball, a stone, or a bag filled with shot, weighing exactly eight pounds. It can be made by melting some old lead and trimming it so that it is as round as possible. It is "put" with one hand and in doing so the shot must be above and not behind the shoulders. It is not to be thrown. The "put" is made from a circle seven feet in diameter. The circle is marked on the ground and is divided into halves by a line drawn through the centre. In the middle of the circumference on the front half, is placed a curved stop-board, four feet long, four inches high, fixed in place by means of pins fastening it to the ground. In making a "put" the feet of the boy may rest against but not on top of this board.

A fair "put" is one in which no part of the boy touches the top of the stop-board, the circle, or the ground outside of the circle and the boy leaves the circle by the rear half, which is the half directly opposite the stop-board. A "put" shall be a foul if any part of the boy touches the ground outside the front half of the circle before the put is measured. The measurement is made from the inner edge of the stop-board to the nearest mark on the ground or floor made by the shot. Each boy is allowed three trials in turn, and the best "put" is recorded.

100 Yards

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of Weight
	SEC.	SEC.	SEC.
100	12	11 3/5	10 4/5
95	12 1/5	11 3/5	11
90	12 2/5	11 4/5	11 1/5
85	12 3/5	12	11 2/5
80	12 4/5	12 1/5	11 3/5
75	13	12 2/5	11 4/5
70	13 1/5	12 3/5	12
65	13 2/5	12 4/5	12 1/5
60	13 3/5	13	12 2/5
55	13 4/5	13 1/5	12 3/5
50	14	13 2/5	12 4/5
45	14 1/5	13 3/5	13
40	14 2/5	13 4/5	13 1/5
35	14 3/5	14	13 2/5
30	14 4/5	14 1/5	13 3/5
25	15	14 2/5	13 4/5
20	15 1/5	14 3/5	14
15	15 2/5	14 4/5	14 1/5
10	15 3/5	15	14 2/5

60-Yard Potato Race

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of Weight
	SEC.	SEC.	SEC.
102	15 4/5	15 3/5	15
98	16	15 4/5	15 1/5
94	16 1/5	15 4/5	15 2/5
90	16 2/5	16	15 3/5
86	16 3/5	16 1/5	15 4/5
82	16 4/5	16 2/5	16
78	17	16 3/5	16 1/5
74	17 1/5	16 4/5	16 2/5
70	17 2/5	17	16 3/5
66	17 3/5	17 1/5	16 4/5
62	17 4/5	17 2/5	17
58	18	17 3/5	17 1/5
54	18 1/5	17 4/5	17 2/5
50	18 2/5	18	17 3/5
46	18 3/5	18 1/5	17 4/5
42	18 4/5	18 2/5	18
38	19	18 3/5	18 1/5
34	19 1/5	18 4/5	18 2/5
30	19 2/5	19	18 3/5
26	19 3/5	19 1/5	18 4/5
24	19 4/5	19 2/5	19
20	20	19 3/5	19 1/5
16	20 1/5	19 4/5	19 2/5
12	20 2/5	20	19 3/5

Running High Jump

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of Weight
	FT. IN.	FT. IN.	FT. IN.
100	4 9	5	5 3
97	4 8	4 11	5 2
94	4 7	4 10	5 1
91	4 6	4 9	5
88	4 4	4 7	4 10
85	4 2	4 5	4 8
82	4 1	4 4	4 7
79	4	4 3	4 6
76	3 11	4 2	4 5
73	3 10	4 1	4 4
70	3 9	4	4 3
64	3 8	3 11	4 2
58	3 7	3 10	4 1
52	3 6	3 9	4
46	3 5	3 8	3 11
40	3 4	3 7	3 10
34	3 3	3 6	3 9
28	3 2	3 5	3 8
22	3 1	3 4	3 7
16	3	3 3	3 6
10	2 11	3 2	3 5

Standing Broad Jump

Credits	Class 3 Boys 14 and 16, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of Weight
	FT. IN.	FT. IN.	FT. IN.
100	8 6	9	9 6
97	8 4	8 10	9 4
94	8 2	8 8	9 2
91	8	8 6	9
88	7 10	8 4	8 10
85	7 8	8 2	8 8
82	7 6	8	8 6
79	7 4	7 10	8 4
76	7 2	7 8	8 2
73	7 1	7 7	8 1
70	7	7 6	8
64	6 11	7 5	7 11
58	6 10	7 4	7 10
52	6 9	7 3	7 9
46	6 8	7 2	7 8
40	6 7	7 1	7 7
34	6 6	7	7 6
28	6 5	6 11	7 5
22	6 4	6 10	7 4
16	6 3	6 9	7 3
10	6 2	6 8	7 2

Throwing for Distance

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of weight
	FT.	FT.	FT.
100	178	230	270
98	176	226	266
96	174	222	262
94	172	218	258
92	170	214	254
90	168	210	250
88	166	206	246
86	164	202	242
84	162	198	238
82	160	194	234
80	158	190	230
78	156	186	226
76	154	182	222
74	152	178	218
72	150	174	214
70	148	170	210
64	146	168	208
58	144	166	206
52	142	164	204
46	140	162	202
40	138	160	200
34	136	158	198
28	134	156	196
22	132	154	194
16	130	152	192
10	128	150	190

Standing Hop, Step, Jump

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespective of weight
	FT. IN.	FT. IN.	FT. IN.
100	21 9	23	24 3
97	21 6	22 9	24
94	21 3	22 6	23 9
91	21	22 3	23 6
88	20 9	22	23 3
85	20 6	21 9	23
82	20 3	21 6	22 9
79	20	21 3	22 6
76	19 9	21	22 3
73	19 6	20 9	22
70	19 3	20 6	21 9
64	19	20 3	21 6
58	18 9	20	21 3
52	18 6	19 9	21
46	18 3	19 6	20 9
40	18	19 3	20 6
34	17 9	19	20 3
28	17 6	18 9	20
22	17 3	18 6	19 9
16	17	18 3	19 6
10	16 9	18	19 3

Shot Put

Credits	Class 3 Boys 14 and 15, over 95 lbs.; Boys 16 and 17 under 111 lbs.	Class 4 Boys 16 and 17, over 110 lbs.	Class 5 Boys 18, Irrespctive of weight
	FT. IN.	FT. IN.	FT. IN.
100	33	35	37
98	32 6	34 6	36 6
96	32	34	36
94	31 6	33 6	35 6
92	31	33	35
90	30 6	32 6	34 6
88	30	32	34
86	29 6	31 6	33 6
84	29	31	33
82	28 6	30 6	32
80	28	30	32 6
78	27 6	29 6	31 6
76	27	29	31
74	26 6	28 6	30 6
72	26	28	30
70	25 6	27 6	29 6
64	24 6	26 6	28 6
58	23 6	25 6	27 6
52	22 6	24 6	26 6
46	21 6	23 6	25 6
40	20 6	22 6	24 6
34	19 6	21 6	23 6
28	18 6	20 6	22 6
22	17 6	19 6	21 6
16	16 6	18 6	20 6

Throwing at Target

10 shots allowed.

Each Bull's Eye scores ..... 10 credits
Each Inner scores..... 8 credits
Each Magpie scores ..... 6 credits
Each Outer scores ..... 4 credits

The foregoing tables give at a glance the number of credits obtained for each attainment in Athletic Events in the three classes in which TUXIS BOYS are graded. They are intended to be used with the Athletic Test under the Physical Program found on page 58, and with Honor Badges for Jumping, Running and Throwing, found on pages 414, 416 and 418.

Canadian Amateur Records

Adopted by the Amateur Athletic Union of Canada

EVENT	TIME OR DISTANCE	HOLDER OF RECORD	AFFILIATION	HELD AT	DATE
40 yards run	4 2/5 sec.	Robert Kerr	Tiger A.C., Hamilton	Hamilton	Feb. 15, 1912
50 yards run	5 2/5 sec.	Robert Kerr	Hamilton Y.M.C.A.	Toronto¶	April 3, 1908
60 yards run	6 2/5 sec.	L. J. Sebert	Toronto W.E. Y.M.C.A.	Toronto¶	Oct. 20, 1910
100 yards run	9 2/5 sec.	Robert Kerr	Hamilton Y.M.C.A.	Halifax	Sept. 3, 1908
			Hamilton Y.M.C.A.	Toronto	Sept. 20, 1908
			Tiger A.C., Hamilton	Toronto	Sept. 11, 1909
		F. L. Lukeman	Montreal A.A.A.	Toronto	June 4, 1910
120 yards run	12 sec.	J. W. Morton	South London Harriers	Montreal	Sept. 16, 1905
220 yards run	21 2/5 sec.	Robert Kerr	Tiger A.C., Hamilton	Toronto*	Sept. 11, 1909
220 yards run	21 2/5 sec.	Robert Kerr	Hamilton Y.M.C.A.	Toronto†	Sept. 20, 1908
		P. J. Walsh	New York A.C.	Montreal‡	Sept. 21, 1909
250 yards run	26 4/5 sec.	M. W. Ford	New York A.C.	Montreal	Sept. 24, 1898
300 yards run	31 4/5 sec.	T. E. Burke	Boston A.A.	Moncton	July 20, 1906
300 yards run	35 2/5 sec.	F. L. Lukeman	Ottawa A.A.C.	Hamilton¶	April 29, 1911
440 yards run	48 2/5 sec.	W. C. Robbins	Irish-American A.C., N.Y.	Montreal‡	Sept. 15, 1909
440 yards run	49 1/5 sec.	L. J. Sebert	Toronto W.E. Y.M.C.A.	Winnipeg§	July 15, 1909
600 yards run	1m. 13 1/5 sec.	T. E. Burke	Boston A.A.	Moncton	July 20, 1906
600 yards run	1m. 20 1/5 sec.	John Tressider	Toronto Central Y.M.C.A.	Hamilton¶	April 29, 1911
880 yards run	1m. 52 2/5 sec.	Emilo Lunghi	Irish-American A.C., N.Y.	Montreal	Sept. 15, 1909
1000 yards run	2m. 19 1/5 sec.	J. L. Tait	Toronto W.E. Y.M.C.A.	Toronto	June 14, 1913
1000 yards run	2m. 22 1/5 sec.	J. Tressider	Toronto Central Y.M.C.A.	Hamilton¶	April 29, 1911
1 mile run	4m. 20 2/5 sec.	A. R. Kiviat	Irish-American A.C., N.Y.	Montreal	Sept. 23, 1912
1 1/2 miles run	8m. 1/5 sec.	M. A. Beale	Wander A.A.C.	Halifax	Sept. 23, 1893
2 miles run	9m. 34 2/5 sec.	T. P. Conneff	Manhattan A.C., N.Y.	Montreal	Sept. 27, 1890
3 miles run	14m. 57 1/5 sec	H. Kolehmainen	Irish-American A.C., N.Y.	Hamilton	Aug. 16, 1913
5 miles run	25m. 31 2/5 sec	F. G. Bellars	New York A.C.	Montreal	Oct. 3, 1908
10 miles run	52m. 44 2/5 sec	Stuart Allen	St. Catharines	St. Catharines	April 10, 1914
15 miles run	1h.25m.43 3/5s	Tom Longboat	Irish-Canadian A.C.	Montreal	Oct. 24, 1908
25 miles run	2h. 38m. 11s.	Harry Lawson	Toronto W.E. Y.M.C.A.	Toronto	June 6, 1908
120 yards hurdles	15 2/5 sec.	A. C. Kraenzlein	Chicago A.C.	Montreal	Sept. 24, 1898
		Forrest Smithson	Multnomah A.A.C., Portland	Montreal	Sept. 21, 1907

*Straightaway. †2/7 mile track. ‡1/5 mile track. §1/6 mile track. ¶Indoor.

CANADIAN AMATEUR RECORDS—Continued

Event	Time or Distance	Holder of Record	Affiliation	Held at	Date
220 yards hurdles	26 1/5 sec.	Geo. H. Barber	Toronto Central Y.M.C.A.	Winnipeg	July 17, 1909
100 meters run	11 sec.	Robert Kerr	Hamilton Y.M.C.A.	Toronto	May 23, 1908
200 meters run	21 4/5 sec.	Robert Kerr	Hamilton Y.M.C.A.	Toronto	May 23, 1908
400 meters run	49 2/5 sec.	L. J. Sebert	Toronto W.E. Y.M.C.A.	Montreal	May 6, 1908
800 meters run	1m. 57 1/5 sec.	Irving S. Parkes	Toronto W.E. Y.M.C.A.	Toronto	May 23, 1908
1500 meters run	4m. 5 sec.	J. L. Tait	Toronto W.E. Y.M.C.A.	Montreal	June 6, 1908
110 meters hurdles	16 4/5 sec.	G. H. Barber	Toronto Central Y.M.C.A.	Toronto	May 23, 1908
400 meters hurdles	58 1/5 sec.	C. D. Bricker	Toronto W.E. Y.M.C.A.	Toronto	May 25, 1906
1 mile relay (4 men)	3m. 22 3/5 sec.	Boston A. A.	Boston A.A., Boston, Mass.	Hamilton	Aug. 16, 1913
1 mile walk	6m. 25 4/5 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	June 4, 1910
2 mile walk	14m. 7 3/5 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
3 mile walk	21m. 35 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
4 mile walk	29m. 4 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
5 mile walk	36m. 37 3/5 sec	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
6 mile walk	44m. 20 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23 1910
7 mile walk	52m. 9 1/5 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
8 mile walk	1h. 5m. 2 2/5s.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
9 mile walk	1h.13m.23 3/5s	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	July 23, 1910
10 mile walk	1h.21m.42 3/5s	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	May 25, 1906
3500 meters walk	16m. 1 3/5 sec.	Geo. H. Goulding	Toronto Central Y.M.C.A.	Toronto	May 25, 1906
Running broad jump	23ft. 8 1/2 in.	C. D. Bricker	Toronto W.E. Y.M.C.A.	Montreal	June 6, 1908
Standing broad jump	10 ft. 4 1/2 in.	A. Quinn	Ottawa Police A.A.	Toronto	June 6, 1908
Running high jump	6ft. 2 1/2 in.	J. K. Baxter	New York A.C.	Toronto	Aug. 17, 1904
Standing high jump	5ft.	R. S. Sheppard	Edmonton Y.M.C.A.	Edmonton	Sept. 16, 1899
Hop, step and jump	47ft. 1 1/2 in.	Dr. J. G. Macdonald	New Glasgow A.A.A.	Halifax	Aug. 2, 1913
Pole vault	12 ft. 5 in.	E. B. Archibald	Toronto W.E. Y.M.C.A.	Toronto	Sept. 12, 1908
Putting 12-lb. shot	51 ft. 5 1/4 in.	J. H. Gillis	Vancouver Police A.A.A.	Vancouver	June 6, 1908
Putting 16-lb. shot	49 ft. 7 1/4 in.	Ralph Rose	Olympic Club, San Francisco	Montreal	Dec. 5, 1908
Throwing 16-lb. hammer	182 ft. 4 in.	M. J. McGrath	Irish-American A.C., N.Y.	Montreal	Sept. 21, 1907
56-lb. weight (height)	15 ft. 9 1/4 in.	Con. Walsh	Woodstock A.A.A.	Toronto	Sept. 24, 1911
56-lb. weight (distance)	40 ft. 6 3/4 in.	M. J. McGrath	Irish-American A.C., N.Y.	Montreal	April 10, 1908
Throwing the Discus	140 ft. 1 in.	J. H. Duncan	Broadhurst Field Club	Montreal	Sept. 24, 1911
Throwing the Javelin	181 ft. 8 in.	E. B. Archibald	Toronto W.E. Y.M.C.A.	Toronto	Sept. 20, 1913
Tossing the caber	41 ft. 5 1/2 in.	E. Desmarteau	Montreal Police A.A.A.	Montreal	June 6, 1908

Canadian Swimming Records

The following records have been accepted by the Canadian Amateur Swimming Association:

INDOOR EVENTS

EVENT	TIME OR DISTANCE	HOLDER	AFFILIATION	HELD AT	DATE
40 yards	19 ⅕ sec.	G. R. Hodgson	M.A.A.A.	Montreal	April, 1912
50 yards	29 ⅖ sec.	L. F. Lee	Victoria Y.M.	Victoria, B.C.	Oct., 1912
100 yards	58 ⅗ sec.	G. R. Hodgson	M.A.A.A.	Montreal	May, 1912
100 yards, (ladies)	1m. 36 ⅕ sec.	Miss M. Griffon		Victoria, B.C.	Oct., 1911
200 yards	2m. 37 ⅗ sec.	A. D. McDonald	Winnipeg Y.M.C.A.	Victoria, B.C.	Oct., 1912
220 yards	2m. 30 ⅕ sec.	G. R. Hodgson	M.A.A.A.	Montreal	April, 1912
440 yards	5m. 25 ⅗ sec.	G. R. Hodgson	M.A.A.A.	Montreal	April, 1912
880 yards	14m. 17 sec.	J. McNeil		Victoria, B.C.	Oct., 1911
1 mile	28m. 11 sec.	M. Ross	M.S.C.	Montreal	June, 1912
220 yards breast stroke	3m. 8 ⅘ sec.	S. Gooday	M.S.C.	Montreal	Dec., 1913
260 yards breast stroke	3m. 56 sec.	S. Gooday	M.S.C.	Montreal	May, 1912
440 yards breast stroke	7m. 18 sec.	S. Gooday	M.S.C.	Montreal	June, 1912
1 mile breast stroke	34m. 26 sec.	Geo. Simpson	Vancouver A.C.	Victoria, B.C.	Nov., 1911
40 yards back stroke	27 sec.	H. Tift	New York A.C.	Montreal	Feb., 1910
100 yards back stroke	1m. 2 ⅘ sec.	S. Gooday	M.S.C.	Montreal	June, 1912
200 yards relay (4 men)	1m. 24 sec.	M.A.A.A. Team		Montreal	April, 1912
Plunge for distance	60 feet	J. Barnes	W.E. Y.M.C.A.	Toronto	Jan. 20, 1914

OUTDOOR EVENTS

50 yards	27 ⅕ sec.	Law Earl	M.A.A.A.	Ottawa	Aug., 1911
100 yards	1m. 2 ⅘ sec.	Frank K. McGill	M.A.A.A.	Halifax	Aug., 1913
220 yards	3m. 4 ⅕ sec.	R. M. Ritter	New York A.C.	Halifax	Aug., 1911
440 yards	5m. 59 sec.	G. R. Hodgson	M.A.A.A.	Toronto	Aug., 1910
880 yards	15m. 30 sec.	J. Kerry	M.A.A.A.	Hamilton	Aug., 1909
One mile	27m. 25 sec.	B. Goodwin	New York A.C.	Toronto	Aug., 1910
220 yards breast stroke	3m. 25 sec.	S. H. Gooday	M.S.C.	Halifax	Aug., 1913
100 yards back stroke	1m. 26 ⅗ sec.	R. M. Ritter	New York A.C.	Halifax	Aug., 1911

Long distance, Guard Pier to Isle Gros Bois, Montreal, Aug., 1911—2 hours, 35 minutes—F. Kearsley. (Approximately 15 miles.)

APPENDIX

APPENDIX

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CHAPTER XX

BOOKS WORTH READING

Compiled by L. M. Smith, B.A.,
Toronto Public Library.

A CLOSE acquaintanceship with good books is invaluable. Every TUXIS BOY who is endeavoring to develop the intellectual side of his life will want to know of books that are worth reading in the realm of fiction, biography, history, nature, handicraft, etc. The list presented here is by no means exhaustive and is intended simply as a means of pointing the way to an intelligent interest in reading books that will make a valuable addition to a boy's store of knowledge. If you are living where a public library is available consult the librarian or his assistants regarding additions to this list.

Fiction

Adams, W. H. D.	The Days of Chivalry.
Altsheler, J. A.	Horsemen of the Plains.
Althsheler, J. A.	Hunters of the Hills.
Austen, Jane	Pride and Prejudice.
Barrie, Sir J. M.	Little Minister.
Black, William	Princess of Thule.
Blackmore, R. D.	Lorna Doone.
Catherwood, M. H.	Rocky Fork.
Catherwood, M. H.	Romance of Dollard.
Churchill, Winston	The Crossing.
Churchill, Winston	Richard Carvel.
Connor, Ralph	Black Rock.
Connor, Ralph	Sky Pilot.

Craik, D. M. (Mulock)	John Halifax, gentleman
De Morgan, William	Joseph Vance.
Dickens, Charles	Oliver Twist.
Dickens, Charles	Our Mutual Friend.
Dickens, Charles	Tale of Two Cities.
Doyle, Conan	Sherlock Holmes.
Doyle, Conan	Sir Nigel.
Doyle, Conan	White Company,
Dumas, Alexandre	Count of Monte Cristo.
Dumas, Alexandre	Three Musketeers.
Eggleston, Edward	Hoosier Schoolboy.
Eggleston, Edward	Hoosier Schoolmaster.
Eliot, George	Daniel Deronda.
Eliot, George	Middlemarch.
Eliot, George	Romola.
Hawthorne, Nathaniel	House of Seven Gables.
Hughes, Thomas	Tom Brown at Oxford.
Hugo, Victor	Les Miserables.
Huntington, H. S.	His Majesty's Sloop, Diamond Rock.
Jackson, H. H.	Ramona.
Johnston, Owen	Varmint.
Kingsley, Charles	Hypatia.
Kipling, Rudyard	Day's Work.
Kipling, Rudyard	Kim.
Kipling, Rudyard	Stalky & Co.
Kirby, William	Golden Dog.
Laut, Agnes	Heralds of Empire.
Lever, Charles	Charles O'Malley.
Lytton, E. R. Bulwer-Lytton.	Last Days of Pompeii.
Parker, Sir Gilbert	How Valmond came to Pontiac.
Parker, Sir Gilbert	Pierre and his People.
Scott, Sir Walter	Guy Mannering.
Scott, Sir Walter	Quentin Darward.
Scott, Sir Walter	Rob Roy.
Stevenson, R. L.	Catriona.
Stevenson, R. L.	Dr. Jekyll and Mr. Hyde.
Stockton, F. R.	Rudder Grange.

Thackeray, W. M.....Henry Esmond.
Thackeray, W. M.....Pendennis.
Thackeray, W. M.....Vanity Fair.
Thackeray, W. M.....Virginians.
Twain, Mark (Clemens)....Tom Sawyer.
Twain, Mark (Clemens)....Innocents Abroad.
Vachell, H. A.....The Hill.
Verne, Jules.....Mysterious Island.
Wallace, Lew.....Ben Hur.
Wayman, S. J.....Gentleman of France.
Weyman, S. J.....House of the Wolf.
White, S. E.....The Forest.
White, S. E.....The Mountains.

History and Biography

Abbot, Jacob.....History of King Alfred of England.
Abbot, Jacob.....History of Queen Elizabeth.
Abbot, Jacob.....Julius Caesar.
Allen, C. F.....David Crockett, Scout.
Atteridge.....Famous Modern Battles
Bone, Florence.....Man in the Red Shirt.
Boswell, James.....Life of Samuel Johnson.
Brady, C. T.....Colonial Fights and Fighters.
Brady, C. T.....Conquerors of Peru.
Carlyle, Thomas.....Life of Frederick the Great.
Chesterfield, Lord.....Letters to his Son.
Creasy, Sir Edward.....Fifteen Decisive Battles of the World.
Dix, E. A.....Champlain, the Founder of New France.
Elias, Edith.....In Georgian Times.
Elias, Edith.....In Stewart Times.
Elias, Edith.....In Tudor Times.
Elias, Edith.....In Victorian Times.
Froissart's Chronicles

Gaskell, E. C.	Life of Charlotte Bronte
Gray, Jane	Last of the Plainsmen.
Grinnell, G. B.	Beyond the Old Frontier.
Hare, Christopher	Story of Bayard.
Hasbrouck, L. S.	La Salle.
Johnston, C. H.	Famous Cavalry Leaders.
Johnston, C. H.	Famous Discoverers and Explorers of America.
Keller, Helen	Story of My Life.
Kingston, W. H.	Captain Cook.
Laut, Agnes	Canada, the Empire of the North.
Laut, Agnes	Vikings of the Pacific.
Moses, Belle	Charles Dickens.
Parkman, Francis	Conspiracy of Pontiac.
Parkman, Francis	Montcalm and Wolfe.
Parkman, Francis	Oregon Trail.
Southey, Robert	Life of Nelson.
Washington, B. T.	Up from Slavery.
Wheeler, Harold, F. B.	Lord Kitchener.
Wheeler, Harold, F. B.	Lord Roberts.

Literature and Poetry

Benson, A. C.	Through a College Window.
Church, Alfred	The Iliad for Boys and Girls.
Church, Alfred	The Odyssey for Boys and Girls.
French, Allen	Heroes of Iceland.
Jameson, A. B.	Shakespeare's Heroines.
Lang, John	Poetry of Empire.
Longfellow, H. W.	Courtship of Miles Standish.
Ruskin, John	Crown of Wild Olives.
Scott, Sir Walter	Marmion.
Shakespeare, William	Corolianus.

Shakespeare, William.....King John.
Shakespeare, William.....Richard III.
Thoreau, H. D.....Maine Woods.
Thoreau, H. D.....Walden.
Windsor.....Lyra Historica.

Travel and Exploration

Hyamson, A. M.....Elizabethan Adventurers of the Spanish Main.
Pyle, Howard.....Buccaneers and Marooners of America.
Stevenson, R. L.....Travels with a Donkey.
Verrill, A. H.....Cruise of the Cormorant.
Verrill, A. H.....In Nansen's Wake.
Young, E. R.....Battle of the Bears.
Nansen, F.....Farthest North.
Stoddard, J. L.....Lectures.

Nature Study and Animal Stories

Long, W. J.....Beasts of the Field.
Long, W. J.....Northern Trails.
Roberts, C. G. D.....Feet of the Furtive.
Roberts, C. G. D.....Haunters of the Silences
Seton, E. T.....Wild Animal Ways.
Fabre, H.....Mason Bees.
Fabre, H.....Life of the Spider.

Handicraft, Hobbies, Games and Sports

Adams, J. D.....Carpentry for Beginners.
Adams, J. H.....Harper's Indoor Book for Boys.
Adams, J. H.....Harper's Outdoor Book for Boys.
Hall, Cyril.....The Young Carpenter.
Miller, W. H.....Boy's Book of Hunting and Fishing.

Verrill, A. H.....Book of the Sailboat.
Collins, F. A.....Photography.
Claudy, C. H.....First Book of Photography.

Practical Science and Occupations

Adams, J. H.....Harper's Electricity Book for Boys.
Adams, J. H.....Harper's Machinery Book for Boys.
Bond, A. R.....Pick, Shovel and Pluck.
Chatterton.....Sailing Ships and Their Story.
Clarke, C. J.....Boy's Book of Modern Marvels.
Clute, W. N.....Agronomy.
Collins, A. F.....Book of Electricity.
Collins, A. F.....Money Making for Boys.
Creasy, Sir Edward.....All about Engines.
Hall, Cyril.....Modern Weapons of War.
Knox, G. D.....Engineering.
Speight.....Romance of the Merchant Venturers.
Verrill.....Book of the Motor Boat

Supplies

All supplies necessary for carrying on a C. S. E. T. program, including manuals, record books and blanks, charting forms, wall charts, honor badges, initiation ceremonies, membership pins, etc., may be obtained from the C. S. E. T. Supply Depot, 120 Bay Street, Toronto.

Prices sent on application.

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